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Making Strategic Choices: Prioritizing HIV Interventions in a Resource-Limited Setting

Options for Ghana's Next HIV National Strategic Plan

This publication was prepared by Sayaka Koseki, Vibhuti Haté, Melissa Schnure, Arin Dutta, and Alexander Paxton of the Health Policy Project.

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EXECUTIVE SUMMARY

Background

In 2014, the Ghana AIDS Commission (GAC), the Ghana Health Services/National AIDS Control Program (NACP), UNAIDS and other major stakeholders involved in Ghana's national HIV & AIDS response collaborated with the USAID- and PEPFAR-funded Health Policy Project (HPP) to conduct a strategic investment case analysis for the HIV program in Ghana to inform the new National HIV & AIDS Strategic Plan (NSP) 2016-2020. Taking into account the current epidemic and funding context, the analysis examined how three scenarios corresponding to various levels of funding would affect the scale-up and health impact of key HIV interventions such as prevention and treatment for key populations. However, the country's NSP 2011-2015 identified strategic areas beyond these key interventions that play a significant role in the overall program response. As such, GAC and major stakeholders requested that HPP conduct an expanded investment case (EIC) analysis to examine the impact of these additional areas, comprised of interventions that directly impact prevention and treatment, as well as supporting interventions that contribute indirectly to the response.

Methodology

The EIC was done in two parts: first, a cascade analysis examined the population flows through prevention and treatment programs. Second, these results fed into a modeling analysis to assess the impact of three coverage scenarios.

The cascade analysis used existing quantitative data to assess the success of current key interventions and to develop theoretical prevention and treatment cascades. To further identify gaps in these cascades and in the existing HIV program, we also conducted qualitative interviews, during which key informants (KI) in Ghana ranked current efforts along the HIV prevention and treatment cascades. These KIs also completed a budgeting exercise in which they allocated theoretical budget dollars to direct and indirect interventions.

Taking a similar approach to HPP's initial investment case analysis, the EIC used the Goals model to project the impact of three coverage scenarios. Scenario 1, the *NSP Target* scenario, serves as a baseline, in which coverage rates are set for both prevention and treatment efforts to achieve the targets likely to be set in the upcoming NSP (2016-2020). Scenario 2, the *Cascade- Constrained* scenario, models a "realistic scale-up" where coverage rates are set given the existing limitations of the health system and the policy environment. Fiscal constraints are not, however, included in this scenario; this scenario reflects the priority and political support (or lack thereof) for specific supporting activities and the limitations of resource mobilization to achieve country targets when constraints in health systems and policy environments are not addressed. Scenario 3, the *Fiscally-Constrained* scenario, set coverage rates given the limited financial resources available for national HIV efforts, prioritizing allocation of funds first to high impact interventions. See Annex C for further details of how budget limits were calculated and how prioritization was done.

Results

Cascade analysis: Major barriers and priority interventions

Major barriers to the HIV program occur along the prevention and treatment cascades. Overall, the biggest barrier identified by interviewees was significant *stigma and discrimination*, which keeps much of the target population from being identified and reached by the program. Other major barriers include insufficient capacity for scale-up, low awareness of HIV status, low levels of testing and counseling, and poor adherence to treatment regimens while in care. Despite citing stigma and discrimination as the most

significant barrier to program success, KIs tended to prioritize direct interventions over indirect interventions, representing a possible inconsistency in thought. High priority *direct interventions* included increasing distribution of condoms and condom-compatible lubricants, expanding the peer educator program, training health workers on provider-initiated testing and counseling, and increasing targeted behavior change communication. Priority *indirect interventions* included strengthening supply chain management (especially with regards to HIV test kits), improving advocacy to reduce stigmatizing policies, and improving referral systems between outreach, drop-in centers, and ART sites.

To be able to achieve the 90-90-90 treatment goal, Ghana will have to mobilize US$80 million per year just for treatment. This is a significant increase from what was budgeted under the NSP costing for FY2015 (US$19 million). Even if such significant resource mobilization was successful, unless the country addresses the health systems and policy gaps identified in this study, it will not achieve its ultimate goal of getting 90 percent of PLHIVs to know their status, 90 percent of them to be on treatment, and 90 percent of those on treatment to be virally suppressed.

Modeling analysis

Under Scenario 1, the NSP scenario, the Goals modeling projected about 23,389 new HIV infections from 2016-2020. This number increased to 26,528 in Scenario 2 (Cascade-constrained) and 29,249 in Scenario 3 (Fiscally-constrained), due to the decreasing numbers of people reached annually with ART and lower coverage of key prevention interventions. Much of the other health indicators projected in the Goals analysis showed a similar pattern, with infections among key risk groups and total AIDS deaths both increasing from the baseline scenario to the constrained scenarios.

New Infections 2016-2020				
Scenarios	**Adults 15-49**	**Children 0-14**	**Adults 49+**	**Total**
Scenario 1: Baseline	18,211	3,735	1,443	23,389
Scenario 2: Cascade-constrained	20,990	3,876	1,662	26,528
Scenario 3: Fiscally-constrained	23,431	3,955	1,863	29,249
AIDS Deaths 2016-2020				
Scenarios	**Adults 15+**	**Children 0-14**	**Deaths averted by ART**	
Scenario 1	25,168	7,921	87,957	
Scenario 2	30,602	7,844	82,600	
Scenario 3	36,236	7,596	77,214	

Discussion

With competing priorities and financial limitations posing an increasing challenge to the Ghana HIV program, stakeholders must think strategically about where to focus scale-up efforts to maximize impact. While key interventions—those that directly prevent new infections or reduce mortality and morbidity—must remain a priority, our qualitative analysis identified several other direct and indirect interventions that deserve programmatic attention. As demonstrated in the Goals modeling, neglecting to focus on these areas—which range from reducing stigma and discrimination to improving supply chain management—will hinder efforts to scale up to the NSP target scenario, thus preventing the program from reaching its full potential to avert new HIV infections and AIDS-related deaths.

Through this exercise, several crosscutting health system and policy gaps were identified that spanned multiple risk groups. Notably, the fear of stigma and discrimination appeared in several prevention areas as a barrier to accessing services. Additionally, low rates of HIV testing and counseling (among both key populations and the general population), low knowledge of HIV prevention and testing services, and low rates of treatment adherence were identified as key gaps in the health system.

To maximize the resources available, this study recommends a streamlined list of interventions that likely have the highest impact that should be considered for the development of the upcoming NSP (Table ES 1). By taking on these prioritized interventions, Ghana's HIV program can be more effective and efficient in increasing reach and success of its prevention and treatment programs.

Table ES 1. Summary of Recommendation for Future NSP

Program Component	Target Population	Recommendation for Future NSP
Prevention	FSW	• Continue investing in the PE program • Ensure commodity security and distribution of condoms and HIV test kits • Prioritize evaluation of current programs and develop clear strategy based on evidence
	MSM	• Adopt new approaches to reach MSM in an environment of widespread stigma and discrimination* • Foster meaningful engagement between GAC and MSM community through active civil society engagement • Consider hiring a representative from MSM community to lead CSO engagement • Continue scaling sensitivity trainings for healthcare providers and law enforcement • Focus efforts on gathering additional data on MSM
	PWID	• Build the evidence base for additional investment through population size estimation, behavior, and HIV prevalence surveys
	PMTCT	• Achieve PMTCT scale-up potential through increased training of health workers in ANC clinics • Strengthen SCM of HIV test kits*
	Sero-discordant Couples	• Continue expanding CHTC, prioritizing efforts through the ANC
	General Population (Adult PLHIV)	• Implement improved BCC campaigns focused on HTC*
Treatment	All population (Mainstreamed) & Cross-cutting	• Scale-up VL monitoring and use data to measure progress towards 90-90-90 • Strengthen HMIS and improve data sharing to enable PLHIV tracking and analyze data on how PLHIV are lost in the cascade • Ensure appropriate focus remains on care and support for PLHIV • Generate evidence-base to improve BCC campaigns ultimately to increase HTC uptake and treatment adherence

* The intervention can benefit other target population, but is especially critical to the listed sub-group.

ABBREVIATIONS

AIM	AIDS Impact Model
ANC	antenatal clinic
ART	antiretroviral therapy
ARV	antiretroviral
BCC	behavior change communication
CDC	Centers for Disease Control and Prevention
CHTC	couples HIV testing and counseling
EIC	expanded investment case
DIC	drop-in center
FP	family planning
FSW	female sex workers
GAC	Ghana AIDS Commission
HIV	human immunodeficiency virus
HMIS	health management and information systems
HRH	human resources for health
HSS	health systems strengthening
HTC	HIV testing and counseling
IBBSS	Integrated Biological and Behavioral Surveillance Survey
IEC	information, education, and communication
KI	key informants
KP	key populations
M&E	monitoring & evaluation
MAT	medication-assisted treatment
MOT	modes of transmission
MSM	men who have sex with men
MTE	mid-term evaluation (of the NSP)
NACP	National AIDS/STI Control Programme
NFM	New Funding Model
NSP	National HIV & AIDS Strategic Plan
OVC	orphans and vulnerable children
PE	peer educators
PEPFAR	U.S. President's Emergency Plan for AIDS Relief
PHC	primary health care
PITC	provider-initiated testing and counseling
PLHIV	people living with HIV
PMTCT	prevention of mother-to-child transmission
PWID	people who inject drugs
RH	reproductive health
SCM	supply chain management
SDP	service delivery points
SGBV	sexual and gender-based violence
STI	sexually transmitted infection
TB	tuberculosis
TRP	Technical Review Panel
UNAIDS	United Nations Joint Programme on HIV/AIDS
USAID	United States Agency for International Development
WHO	World Health Organization

1. INTRODUCTION

With a growing international focus on sustainable financing for health and for HIV programs specifically, Ghanaian stakeholders have sought to identify the country's most urgent needs to improve HIV prevention and treatment programs and most impactful investments considering those needs. Currently, in-country stakeholders and partners involved in Ghana's national HIV & AIDS response are working to develop the National HIV & AIDS Strategic Plan (NSP) 2016-2020, to replace the NSP ending in 2015. This process involves strategic conversations around priority areas for Ghana's HIV & AIDS response, with specific consideration of how to make the most impactful investments.

Box 1: Key Interventions for HIV Prevention and Treatment

- HIV testing and counseling [HTC]
- Prevention activities for key populations [KPs]
- Prevention activities for the general population
- Antiretroviral treatment [ART]
- Prevention of mother-to-child transmission [PMTCT]

In October 2014, Ghana submitted a concept note proposal to the Global Fund to Fight AIDS, Tuberculosis and Malaria (Global Fund) under the New Funding Model (NFM) mechanism requesting support for HIV and TB programs from 2015 through 2017. To inform this proposal, the USAID- and PEPFAR-funded Health Policy Project (HPP) analyzed the potential mortality reduction that can be achieved based on varying coverage levels of key HIV prevention and treatment direct interventions (Box 1) (1). Assuming four funding scenarios related to the NFM – with varying coverage assumptions – the previous HPP analysis (*The Costs and Impacts of Investing in the HIV Response in Ghana*, from here referenced as the investment case analysis) used the Goals mathematical model integrated with the well-known Spectrum suite of models to estimate the health impact of key HIV interventions.

As the NSP 2011-2015 comes to a close, the results of the 2015 HPP investment case analysis are helpful to inform the new strategy for the key interventions it considered. However, the 2011-2015 NSP identified additional strategic interventions beyond these key interventions (Box 2) (3). These include interventions directly impacting prevention and treatment, as well as supporting interventions, which contribute indirectly to these impacts. As such, stakeholders in Ghana requested an expanded investment case (EIC) analysis to examine the impact, cost, and priorities within all interventions, including these additional indirect and direct interventions in the overall response, in preparation for the next NSP. Prioritization in this context includes ranking the key interventions that should be maintained or scaled-up in the next NSP, using qualitative and quantitative evidence, as well as looking at the impact of various coverage scenarios, which assume different combinations and scale of coverage of interventions.

Box 2: Additional Strategic Interventions, as identified in 2011-2015 NSP

Sample of additional strategic interventions not considered in the prior HPP investment case analysis:

- Strengthen the supply and logistics management for ARV drugs
- Strengthen referral system
- Build capacity in HTC and strengthen PITC through training of health staff
- Strengthen community approach to couples counselling and testing
- Create an enabling environment for KP interventions through focused advocacy

This document is designed as a companion piece to the 2015 HPP investment case analysis, and should be interpreted as such. A review of the epidemiological context for HIV in Ghana, for instance, can be found in the 2015 HPP investment case analysis (1). In this chapter, we review the mid-term evaluation of the previous NSP as well as the technical review of the NFM concept note, and examine the contextual factors guiding the EIC, such as the resource envelope for the new NSP. Based on the barriers to implementation identified and the rationale for prioritization these resources provide, we develop three coverage scenarios to assess the impact if NSP goal is achieved, or if the program is hampered by programmatic and financial barriers.

Policy Context

NSP 2011-2015: Strategic Areas and Mid-term Evaluation

The NSP 2011-2015 outlines the following areas as critical to the overall HIV response in addition to the key HIV interventions examined in the previous Goals analysis: mitigation of the social and economic impact of HIV (e.g. OVC care), health systems strengthening (HSS), community systems strengthening, policy and advocacy, coordination and management, and strategic information and monitoring & evaluation (M&E) (3). While these supporting intervention areas do not directly prevent new HIV infections or reduce mortality and morbidity, they facilitate the success of the key interventions by supporting scale-up, ensuring commodity security, and/or providing an enabling environment for service delivery and utilization. The pathways with which these supporting intervention areas affect the direct prevention and treatment activities are examined in this report.

Box 3: Mid-term evaluation of the National Strategic Plan: Main recommendations

- maintain and strengthen **key priority interventions**, including behavior change communication (BCC) for key and vulnerable populations; eliminating mother-to-child transmission ; and quality treatment, care, and support for PLHIV
- integrate **socioeconomic needs** of AIDS-impacted households into key national programs
- strengthen HIV **M&E**, including quality, consistency, and validity of data
- operationalize Procurement and **Supply Chain Management** Master Plan
- develop strategy to increase technical, material, and financial support for **community-level organizations**
- identify critical capacity gaps
- strengthen **coordination structures** of the national response, especially at the decentralized level
- ensure all **funding commitments** are honored

The mid-term evaluation (MTE) of the NSP 2011-2015 highlighted the need to sustain and improve high impact interventions such as PMTCT and treatment, care, and support interventions for people living with HIV (PLHIV) throughout 2014 and 2015 (4). Furthermore, the MTE went beyond just key interventions to include recommendations for the supporting intervention areas of the NSP. Regarding mitigation of social and economic impacts of HIV, the MTE emphasized the need to integrate socioeconomic needs of AIDS-impacted households into the national social protection programs. Among the recommendations for M&E strengthening were improving the quality, consistency, and validity of data and strategic information for the national response, which includes community-level data systems. Importantly, the MTE also noted that key limitations within the health system's supply chain management system were negatively impacting the efforts to achieve the greater goals of the NSP. Other recommendations included mobilizing support for community-level organizations, identifying critical gaps for capacity building, and strengthening the coordination structures of the national HIV response, particularly at the decentralized level. While all of these issues could not be examined in this EIC, we do consider several of these recommendations carefully, such as supply chain management, and strategic information systems.

Ghana NFM proposal and TRP comments

The Global Fund's new funding model (NFM) concept note emphasizes the need for strategic investment for maximum impact (5). As such, Ghana's NFM proposal outlines the current and anticipated funding landscape for HIV, using results from HPP's 2015 investment case analysis. The proposal states that funds available from the Government of Ghana, PEPFAR, and other partners meet 70 percent of the anticipated funding requirement for the HIV program alone for 2015-2017. In combination with the requirements of the Ghana TB program, the full requested amount was US$124 million, distributed across 12 priority modules, which will fulfill 20 percent of the funding need, indicating an estimated total funding gap of US$48 million. Based on recommendations and comments from the Technical Review

Panel (TRP), the Grant Approvals Committee endorsed an allocation amount of US$110 million, with an upper-ceiling amount of US$119 million (2).

The Ghana NFM concept note provided an overview of the country context with respect to HIV and TB, including (a) the epidemiology of both diseases, (b) key populations with low access to services, (c) key human rights barriers and gender inequalities with the potential to impede access to services, and (d) health systems and community systems issues within the country that affect service delivery for these two disease programs. While Ghana's HIV epidemiological context is reviewed in the 2015 investment case analysis and therefore won't be repeated here, the issues raised for parts b-d are worth noting.

- **Key populations with low access to services:** The NFM proposal highlighted that legal barriers—on top of stigma and discrimination—are a common thread among key populations. Populations such as female sex workers (FSW), men who have sex with men (MSM), and people who inject drugs (PWID) are liable to arrest, prosecution, and imprisonment.
- **Gender inequalities**: The proposal notes that unequal access to education as well as sexual and gender-based violence (SGBV) play important roles in limiting access to health services.
- **Health systems and community systems issues**: Several weaknesses were mentioned in the concept note, including challenges in procurement and supply chain management, low data completeness and integration within health management information systems (HMIS), inequitable distribution of human resources for health (HRH), and poorly developed capacity within community-based organizations.

The TRP found that the concept note was based on strong epidemiological analysis, and noted the attention to variations among key populations and geographic areas (2). Specifically, the TRP's comments noted that while overall HIV prevalence in Ghana seems to be decreasing, prevalence in the Eastern and Ashanti regions appears to be considerably higher than Upper West and Northern regions, and there remain pockets of high prevalence among FSW and MSM.

Within the HIV program context, the TRP identified ART, PMTCT, and key populations as "critical targets" to help reduce HIV infections and AIDS-related deaths, and identified improving HMIS, M&E, and community participation as "critical enablers" for this response. These priorities, as well as other areas of concern, can be found in Box 4.

Box 4. The Technical Review Panel's (TRP) comments on Ghana's NFM concept note

Critical targets for reducing HIV infections and AIDS-related deaths:
- ART
- PMTCT
- Key populations

Critical enablers for the HIV & AIDS response:
- HMIS
- M&E
- Community participation

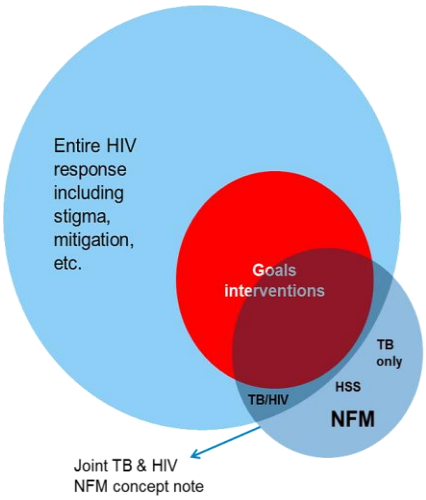
Select **areas of concern**:
- weak budgeting for supply chain management
- lack of commitment for domestic funding
- declines in condom use among the general population
- limited scale-up of counseling and testing among the general population
- lack of data and planning for PWID

Source: (2)

Rationale for an Expanded Investment Case Analysis

While the 2015 investment case analysis projects several health impact indicators such as new HIV infections by age and risk group, AIDS-related deaths, total cost, and incremental cost-effectiveness , these results only measure the impact of increases across key interventions—coverage for ART, PMTCT, FSW, MSM, and HTC. However, as demonstrated in the discussion of the NSP 2011-2015, NFM, and TRP comments, the national HIV & AIDS response must factor in several other supportive intervention

areas that both contribute to health impacts and require planned funding (2, 3, 5). The investment case report included Figure 1 as a visual representation of this distinction. Given a likely funding shortfall as compared to the funding level required to achieve the new NSP targets, there is also a need for prioritization so that the scale-up targets the key direct and indirect interventions that fully support the desired impact.



Source: (1)

Figure 1. Relative inclusion of interventions across current Goals model, the NSP, and the NFM concept note

This highlights the importance of an expanded investment case analysis that includes all intervention areas (both direct and supportive) and focuses on prioritizing funding within all areas of the HIV program to achieve the highest impact within the funding and programmatic constraints. Therefore, as an extension of the first Goals investment case exercise, HPP partnered with the Ghana AIDS Commission (GAC), the Ghana Health Services/National AIDS Control Program (NACP), UNAIDS, and other major stakeholders to conduct an expanded investment case (EIC) to identify the priorities and areas for strengthening across both prevention and treatment interventions, including the costs and impacts of making these priority investments into key interventions for the next NSP. A scope of work was developed with the specific goal of providing a scientific basis for optimizing annual spending in the next NSP to maximize gains in program interventions. The analysis includes both direct and supportive interventions; however, due to time and data limitations, a full differential, quantitative analysis of enabling factors (e.g. stigma and discrimination, policy and advocacy, health systems strengthening, etc.) could not be conducted at this time. However, we included a qualitative assessment of these areas and incorporated their cumulative effects into our quantitative analysis.

2. METHODOLOGY

This study focuses on two main objectives: (1) to analyze the impact of key care, treatment, and behavioral and biomedical prevention interventions on reducing HIV transmissions, and (2) to assess the direct and indirect impact of supporting activities on the implementation of direct prevention and treatment efforts. Supporting activities include aspects of health systems and the surrounding policy environment that influence the effectiveness of key prevention interventions. To achieve these objectives, we conducted a prioritization analysis (see Box 5). Through this analysis, we identified priority interventions that will have the broadest impact on achieving the goals laid out in Ghana's next NSP. This report aggregates these findings by highlighting the identified critical enablers and gaps along the prevention and treatment cascade. These cascades informed the three scenarios to model the impact of prioritization and the effects of programmatic and financial barriers to achieve the NSP goals. Through this scenario analysis, we identified recommendations to inform the new 2016-2020 NSP. The methodology is outlined in

Figure 2 below.

Box 5. Prioritization Analysis versus Optimization Models: A prioritization analysis differs from previous and ongoing efforts to identify "optimal" investment approaches for national HIV programs in several significant ways:

1. Models focusing optimal allocation of resources do not take into account the **capacity of countries to scale-up coverage effectively**.
2. Despite including unit costs, optimization models do not include an **analysis of the impact of fiscal limitations on countries' ability to achieve coverage targets**.
3. Optimization models are mathematical models that can reveal important information regarding the optimal allocation of resources, but they do not take into account the **state of existing efforts on-the-ground, the limitations to scale-up, and stakeholder priorities**.
4. A prioritization analysis **accounts for competing programmatic priorities, policy constraints, and health systems realities** that decision-makers must take into account while allocating resources for scale-up, and allows for a more nuanced analysis that includes **qualitative data** gathered through interviews.

Data Sources

The prioritization analysis used both quantitative and qualitative data (

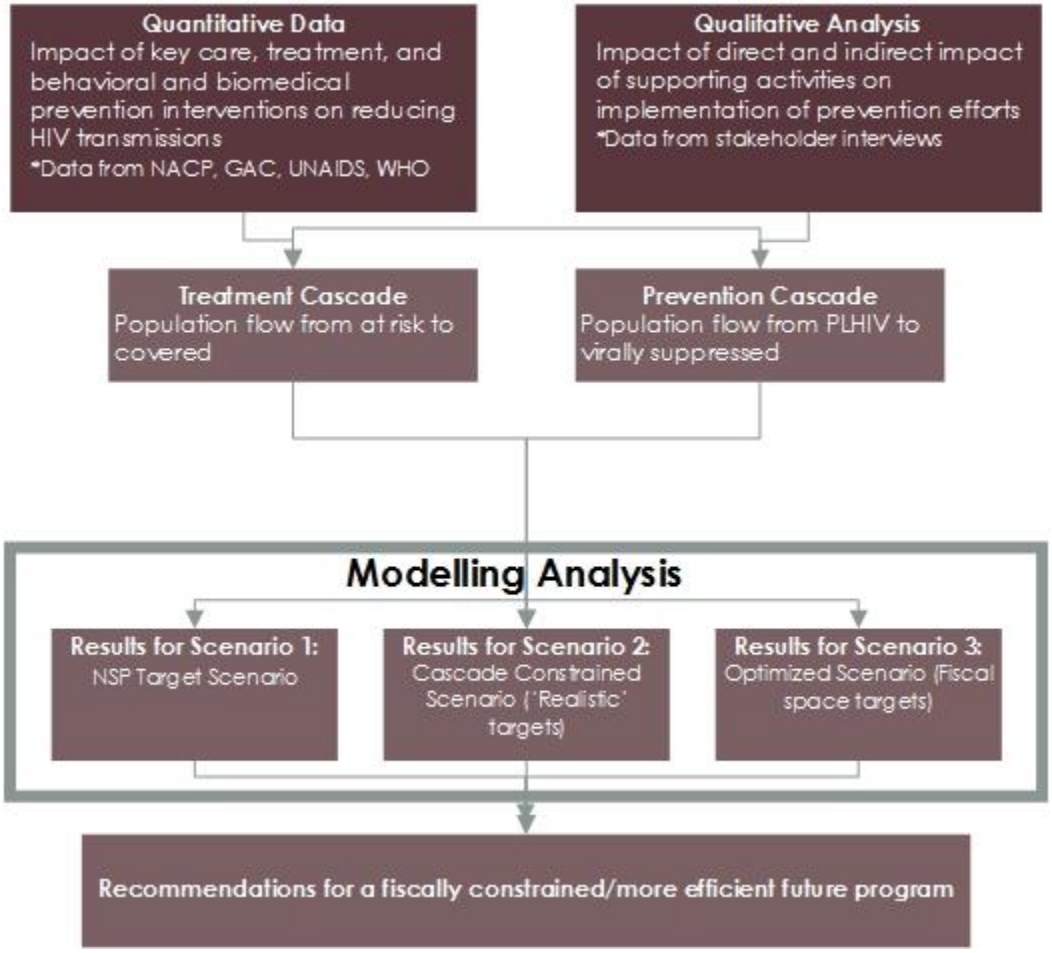
Figure 2). To measure impact of key interventions, **quantitative data** was gathered from numerous sources including, but not limited to, the Mode of Transmission (MOT) reports, Ghana's 2011-2015 NSP, and the 2011 Integrated Biological and Behavioral Surveillance Survey (IBBSS). Information on current coverage of interventions, size of population-at-risk, and HIV prevalence among target groups was mainly used to inform the modelling analysis. Quantitative data on number of target population covered through each step of the prevention and treatment cascades were used to determine the performance of the cascades.

To understand the direct and indirect impact of the health system and policy environment on direct prevention and treatment efforts, we conducted extensive **qualitative interviews** with Key Informants (KI) in Ghana. KIs ranked current efforts in HIV prevention among KP, PLHIV, and the general population, in addition to completing a hypothetical budgeting exercise. The results of this budgeting exercise are included in Annex B: Cascade Diagrams & Budget Exercise.

Data from both sources was then inputted into prevention and treatment cascades, which allowed us to parse out gaps in existing programs, current trends in coverage targets, and stakeholder priorities for

investment in future scale-up. Results from the prevention and treatment cascades are discussed in Sections 3 and 4 of this report.

Figure 2. Analysis Framework for the Expanded Investment Case Analysis



Source: Authors

Quantitative Analysis

The quantitative section of this analysis mostly follows the same methodology as the previous investment case analysis, using the Goals module of the Spectrum Policy Modeling System; however the scenarios modeled in this report are new (1). For a detailed explanation of the Goals methodology, please refer to the 2015 investment case report. In addition, this EIC used quantitative data to develop the prevention and treatment cascades, as at-risk groups and PLHIVs are reached through prevention and treatment interventions. The primary outcomes of the Goals model are HIV infections and populations; therefore, interventions designed to mitigate social and economic the effects of HIV in positive individuals are excluded from this analysis.

Qualitative Analysis

We conducted the qualitative review to identify the factors in the policy environment and the overall health system that have a direct or an indirect impact on the effectiveness of key interventions for both prevention and treatment of HIV. The qualitative assessment was carried out using survey style interviews with KIs within NACP, PEPFAR, and other national experts. KIs were selected from a pool of potential interviewees who work within a range of programmatic areas and can speak knowledgeably on program success and challenges. The qualitative review was divided into two parts: Part A and Part B. In Part A, KIs were asked a series of questions to rank the current efforts in HIV prevention and treatment services.

As outlined in Figure A1. Framework for Qualitative Review Part A (prevention efforts)Figure A1 in the Methods Annex (Annex A: Methods Annex), Part A consisted of three main steps. In Step 1, KIs were asked to rank target groups, which included FSW and their clients, MSM, PWID, Prisoner populations, HIV-positive women at risk of transmitting to their infants, sero-discordant couples in the general population, general population (adults), and general population (young people).

Next, KIs were asked to assess the level of effort currently being made on key interventions within each target group. This was followed by an assessment of specific direct and indirect activities that are essential in the implementation of key interventions and the level of effort currently being placed on these supporting activities. All assessments of efforts were done using a Likert scale. Supporting activities were selected from both the health systems environment and the policy environment. Our selection of the key interventions and supporting activities are based on PEPFAR and WHO technical guidance and on Ghana's NSP (2011-2015). Indirect health systems and policy conditions included factors such as acceptance of the need for policy/legal reform to reduce stigma, additional research to generate evidence-based recommendations, coordination with stakeholders, training health workers to work with stigmatized population, and strengthening supply chain management of HIV test kits.

In part B of the qualitative review, stakeholders were asked to allocate hypothetical budget dollars between target groups with the aim to parse out stakeholder priorities, which allowed us to assess if these priorities aligned with gaps identified in Part A and with global technical guidance. It should be noted that this hypothetical budget exercise was not meant to be an attempt at identifying stakeholder preferences; rather it was an attempt to analyze the factors that influence decision-making related to programmatic activities. This exercise was only conducted for prevention interventions.

Box 6. List of Key Intervention Inputs to Goals Model

Prevention Interventions

- General population: HTC and condom distribution
- FSWs: comprehensive package of prevention services
- MSMs: comprehensive package of prevention services, and lubricant distribution

Treatment Interventions

- ART for adults and children
- PMTCT for pregnant women

First, similar to Part A, stakeholders ranked target groups; in this case, target groups were aggregated as key populations, PLHIV, and the general population (adults and young person). Stakeholders were then asked to allocate hypothetical budget of $100 in each section of the remaining exercise. Stakeholders allocated monies between direct and indirect interventions within each sub-group. We compared the funding allocation with the current efforts being made on key interventions and supporting activities. These prioritization insights were used to inform the recommendations as well as the modeling scenarios; detailed results of this exercise can be found in Annex B.

Modeling Scenarios

For this analysis, three scenarios were designed in the Goals model to inform prioritization of prevention and treatment activities based on programmatic and financial resource constraints. These scenarios were:

Scenario 1 – NSP Target: Coverage rates for key interventions were set for both prevention and treatment efforts to achieve targets outlined in the NSP. This scenario acted as the baseline of comparison to Scenarios 2 and 3.

Scenario 2 – Cascade-Constrained: Coverage rates were set given the existing constraints imposed by health systems and the policy environment on HIV prevention and treatment programs. Based on stakeholder interviews, this scenario modeled a "realistic scale-up" of efforts, but, fiscal constraints are not included to isolate and highlight the maximum possible impact achievable without addressing cascade bottlenecks.

Scenario 3 – Fiscally-Constrained: Coverage rates were set based on the intervention unit costs and the current ceiling to the national HIV program. This scenario allocated the resources by prioritizing allocation of funds to high impact interventions first. This exercise highlighted where burden of the funding gap may be placed and where increased resources will be required or efficiency improvements are necessary to achieve the NSP goal.

Detailed assumptions and coverage rates used in the model informed by the analysis can be found in the results section below. Using the Goals model, the impact of lives saved and infections averted were assessed, highlighting the challenging facing current programmatic and financial constraints. Based on these findings, we produced recommendations to be considered to maximize the efforts placed by the upcoming NSP.

3. RESULTS PART A: ANALYSIS OF THE PREVENTION CASCADE: FROM RISK TO RETENTION

Female Sex Workers

Epidemic Overview

Based on the 2011 IBBSS, it is estimated that there are approximately 52,000 FSWs in the country (6). FSWs in Ghana face a significant risk for new HIV infections among KP (7). Results from the 2011 IBBSS also indicate that 11.1 percent of FSWs in Ghana are living with HIV (6). We will note here, however, that 2014 MOT report indicates that sex work is responsible for approximately 18.5 percent of all new infections annually in Ghana; FSW account for nearly 3 percent, clients of FSW account for nearly 5 percent, while female partners of clients account for 10.5 percent of all new HIV infections.

Among key populations, FSW face a significant risk for new HIV infections in Ghana. Results from IBBSS (2011) indicate that 11.1% of FSW are living with HIV.

18.5% of all new infections in Ghana are attributable to sex work. FSWs account for nearly 3% of new infections, while clients of FSW and their female partners account for nearly 5% and 10.5% of new HIV infections, respectively.

Current strategies for HIV prevention

The GAC coordinates the national HIV prevention program for FSW with the support of implementing partners. The central component of Ghana's National HIV prevention strategy for KPs is to reach 80 percent of all identified FSWs with a comprehensive package of prevention, protection, treatment, care, and support services. Most prevention-related interventions are carried out through trained peer educators (PE) and a national helpline (Text Me! Flash Me! Call Me! Helpline). Additionally, services are also offered through DICs, which provide FSW with a safe and discrete location that ensures confidentiality.

Gaps in current strategies and challenges to future scale-up

According to Ghana's latest progress report to UNAIDS in 2015, approximately 77 percent of the FSW population is being reached by key prevention services and information (8). There are several supporting interventions in the policy and health systems environment that are vital to the implementation of prevention efforts. Gaps in these efforts markedly weaken key prevention activities for FSW. In addition to allocating sufficient resources towards key prevention interventions among FSW, it is critical that policy makers support the programs and activities that directly or indirectly support Ghana's ability to implement key interventions. Figure B1 in Annex B: Cascade Diagrams & Budget Exercise summarizes the linkage between the supporting policy and health systems interventions with the key prevention efforts. The current policy and health systems gaps that are critical to address for Ghana to successfully achieve its prevention goals are detailed below.

Programmatic challenges:

1. Inadequate **supply chain management (SCM) of condoms and condom-compatible lubricants.**
2. Limited investments in future **expansion of PE program**: While the PE program in Ghana has been successful in reaching large numbers of FSW and facilitating behavior change, it appears that no additional investments will be made in this program. This is particularly problematic considering a large portion of prevention efforts among FSW are undertaken through the PE program. Moreover, it

is critical to include micro-planning activities into broader programmatic planning to ensure that program implementation at the local level is context-specific and effective.

3. Need to **expand BCC** efforts: Stakeholders provided mixed reviews of current investments in scaling up BCC for FSW. We believe that this might be a reflection of the fact that while those FSWs that are reached receive high-quality BCC messaging, insufficient numbers of FSW overall are being covered by prevention services as seen in Figure B1 in the Cascade Diagrams (Annex B: Cascade Diagrams)

Policy environment challenges:

4. **Stigma and discrimination** as the biggest barrier to access prevention services: Stakeholders felt strongly that unless additional resources were spent to target stigma and discrimination against FSW, all prevention efforts would fall short of increasing coverage to 80 percent.
5. Efforts to **monitor and evaluate current programmatic activities** should be strengthened: Stakeholders highlighted the lack of availability of routine M&E and strategic information as a problem for HIV prevention activities for activities targeting FSWs and others.

Recommendations

Based on extensive research and interviews with stakeholders we recommend that the following steps be taken to scale up Ghana's prevention program for FSW -

1. **Sustain and scale up the PE program**: Continued and increased investment in the PE program is key to improving coverage among FSW.
2. **Strengthen SCM of prevention-related commodities, especially HIV test kits and condoms.**
3. **Adopt strategies to reach FSW accounting for widespread stigma and discrimination:** We recommend that GAC consider strengthening meaningful engagement with representatives from FSW populations and civil society groups in the design, implementation, and evaluation of services targeting FSWs. Moreover, GAC should review its own offerings and processes to ensure it is being open to these populations.
4. **Develop a strategy to target clients of FSW**: Clients of sex workers represent a critical bridging population in terms of transmission between FSWs and the general population (9). They are also by definition more likely to engage in certain types of risky sexual behaviors. However, there is no separate strategy in place to target clients of FSW with HIV prevention efforts. This represents an opportunity to more efficiently target high-risk individuals in the general population and reinforce current efforts targeting FSWs.
5. **Strengthen use of M&E systems for programmatic purposes.** Based on KI's responses, there is a need to explore ways to make routine data available to program implementers on a frequent basis to inform regular activities. Further consultations with implementers are recommended to determine data needs and inform reporting procedures.

It is important to note that the above recommendations are also aligned with overall stakeholders' priorities. To determine if stakeholder priorities align with the research team's findings, we conducted a hypothetical budget allocation exercise where key informants were asked to allocate hypothetical dollars to a wide range of prevention interventions (for more information on the stakeholder budget exercise, please refer to Annex B: Cascade Diagrams & Budget Exercise). Overall, it appears that with regards to FSW, stakeholder priorities are in-line with the programmatic recommendations listed above. Strengthening SCM for condom distribution and scaling up the PE program, which were identified as currently lacking adequate effort to meet the needs, received appropriately high allocations in the hypothetical budget exercise. On the other hand, other interventions ranked as being essential to HIV

scale-up prevention efforts, such as developing HMIS to adequately track epidemiological trends within this key population, receive only moderate resources from stakeholders.

Men Who Have Sex with Men

Epidemic Overview

The 2011 IBBSS estimates that there are approximately 34,470 MSM in Ghana, although since this is a hard to reach population, most experts believe that the actual number of MSM could be much higher. This key population has the highest HIV prevalence in Ghana at 17.5 percent (7).

Gaps in current strategies and challenges to future scale-up

The national HIV response for MSM is coordinated through the GAC and supporting implementing partners. The HIV response for MSM is very similar to the response for FSW; GAC (in consultation with major stakeholders) has set an 80 percent target for coverage among MSM for comprehensive services provided for prevention, protection, treatment, care, and support services for HIV.

Approximately 11,918 MSM were reached through peer educators in 2014. Stigma and discrimination has been identified by stakeholders as the primary reason only 34.5% of MSM are currently reached with prevention services in Ghana.

The prevention cascade depicted in Figure B2 in Annex B: Cascade Diagrams & Budget Exercise summarizes the key gaps in reaching MSM with prevention services. One of the main gaps in prevention efforts has been the inability to reach a significant proportion of this population due to severe stigma and discrimination against MSM in Ghana. This represents a serious potential threat to this population, including the risk of losing one's job, physical violence, and risk of social hostility (including losing family and friends).

MSM have the highest HIV prevalence in Ghana at 17.5%. However, at present, less than 35% of the MSM population is reached through prevention efforts.

The current policy and health systems gaps that must be addressed for Ghana to successfully achieve its prevention goals for MSM are detailed below -

- **Addressing stigma and discrimination faced by MSM**: Due to stigma and discrimination and the fact that Ghana's laws criminalize same-sex intimate practices, it is significantly less likely that MSM will identify themselves openly. As such, there is growing awareness that prevention efforts for MSM must be adapted to include strategies that provide MSM with anonymity and strengthen trust with service providers.
- Need to **expand BCC** efforts: Stakeholders felt that insufficient numbers of MSM were being reached through BCC efforts. However, this issue is closely interlinked with the barriers faced by MSM in accessing prevention services.

It is important to note that the services provided through the PE program for MSM are of the same high quality as the services provided for FSW. This is why the loss between MSM "engaged" and MSM "covered" is so low (less than 10%). Once MSM are reached by peer educators, they receive good quality prevention services(10). The primary barrier to care is reaching this population.

Recommendations

1. **Adopt strategies to reach MSM accounting for widespread stigma and discrimination:** We recommend that GAC consider strengthening meaningful engagement with representatives from

MSM populations and civil society groups in the design, implementation, and evaluation of services targeting MSMs. Moreover, GAC should review its own offerings and processes to ensure it is being open to these populations. Relationships are developed over time. GAC should consider hiring and empowering trusted individuals from the MSM community to strengthen engagement and advocate for these groups internally. Additional resources to guide MSM engagement and policy reform are listed below.

- *Respect, Protect, Fulfill* – amfAR (11)
- *An Advocacy Guide for Policy Change around MSM Health* – Health Policy Project, 2015 (12)

2. **Focus efforts on gathering additional data on MSM**: Stakeholders felt that data on MSM was not complete, especially compared to the FSW population. In order to develop strategies that are highly effective at reaching MSM, it is critical to gather information on key demographics for this population (such as proportion of MSMs living in urban vs. rural areas, distribution by income and education, etc.)

Similar to stakeholder priorities as revealed through the hypothetical budget exercise for FSW, we conducted a similar budget exercise among stakeholders with regards to MSM. The full results can be found in Annex B: Cascade Diagrams & Budget Exercise. MSM is the only target group where we see higher proportion of funds allocated to indirect activities. This is presumably because focused advocacy to reduce stigma and discrimination is categorized as an indirect intervention in our budget exercise and was repeatedly underscored by stakeholders as the biggest barrier to reaching the MSM population with prevention services. However, despite the importance of stigma and discrimination highlighted by stakeholders, advocacy to reduce stigma and discrimination only received a slightly higher allocation of resources ($14) in the budget exercise compared to distribution of condoms and condom-compatible lubricants.

Another interesting finding from the hypothetical budgeting exercise for MSM is that stakeholders assigned approximately equal proportions of resources to all direct interventions. Based on interviews, we believe this is because prevention efforts for MSM across the board are considered insufficient (not in terms of the quality of services but in terms of the proportion of the population being reached). So, stakeholders felt that all interventions required equal increases in funding.

Prevention of Mother-to-Child Transmission

Epidemic Overview

HIV prevalence among pregnant women is higher than the general population. Based on 2013 HIV Sentinel Surveillance data, the HIV prevalence in pregnant women is approximately 1.9 percent compared to the 1.3 percent HIV prevalence in the general adult population(8).

Current Strategies for HIV Prevention

Ghana has several prevention strategies specifically focused on improving PMTCT services for HIV positive women. The 2011-2015 NSP explicitly includes strategies to improve PMTCT coverage among pregnant women to achieve near elimination of MTCT by 2015. Furthermore, PMTCT has been adopted nationally by Ghana as the main strategy to reduce HIV transmission to infants. PMTCT services are provided at health facilities at all levels (national, regional, district, and local health center levels) in both public and private sectors. PMTCT services are now available in all districts in the country.

While there has been significant commitment at the national level to improve PMTCT services in Ghana, only 60 percent of ANC clients received PMTCT services in 2014 (8). Similarly, only 66 percent of pregnant women who tested positive were placed on ARV prophylaxis to prevent transmission to their infants (8). Approximately 2.09 percent of pregnant women tested HIV positive in 2014.

Gaps in current strategies and challenges to future scale

- Ghana has still fallen short of the coverage targets laid out in the 2011 – 2015 NSP, which sets the benchmark at 100% coverage for HTC among pregnant women who attend ANC; however, Ghana was able to reach only 60% coverage for HTC among ANC clients in 2015.
- Furthermore, while Ghana has set a goal of 95 percent coverage of ARV prophylaxis, only 66 percent who tested positive were put on treatment in 2015.

As we can see from the prevention cascade for HIV-positive women shown in Figure B3 in Annex B: Cascade Diagrams & Budget Exercise shows, one of the central challenges in improving PMTCT coverage is the lack of staff trained to provide HTC within ANC sites. It is important to note that based on stakeholder interviews and mid-term evaluations conducted in Ghana, it appears that the quality of PMTCT services offered are relatively good, however, these services do not cover all pregnant women receiving ANC services. While Ghana has exceptionally high ANC coverage for pregnant women –96.4 percent of pregnant women in Ghana receive at least one ANC visit, and 86.6 percent of women receive four ANC visits – PMTCT packages are not broadly available to pregnant women in the ANC setting (13). A significant proportion of pregnant women accessing ANC care do not receive PMTCT services (nearly 40%). Therefore, to scale-up coverage of PMTCT services, there needs to be renewed focus on provider initiated testing and counseling (PITC). This will require additional training in PITC for staff working in ANC sites.

Another challenge highlighted by stakeholders with improving PMTCT coverage is the SCM of HIV test kits to sites offering PMTCT services. Without sufficient testing commodities, regardless of the number of health workers trained in PITC, it will be impossible to scale-up coverage.

Recommendations

1. **Train additional health workers to provide PMTCT services within ANC settings.**
2. **Ensure that HIV positive women are accessing treatment services.** It is possible that while referral networks are working sufficiently well, women are not accessing ART services (despite referrals), possibly due to stigma and discrimination. We recommend additional research should be carried to identify why HIV positive pregnant women in Ghana are not accessing treatment services despite receiving referrals.
3. **Strengthen SCM of HIV test kits to PMTCT sites.**

A hypothetical budget allocation exercise was also conducted to determine if recommendations developed based on research lined up with priorities for stakeholders. Interestingly, stakeholders ranked the current efforts at integrating PMTCT services into ANC sites as being average (for a full description of the stakeholder budget exercise, please refer to Annex B: Cascade Diagrams & Budget Exercise). Stakeholders allocated a substantial portion of the budget (approximate $41/$100) to the provision of ARV and Cotrimoxazole prophylaxis, instead of towards training more health workers in PITC. Similarly, with respect to indirect interventions, KIs apportioned slightly more money ($28/$100) to improving the SCM of HIV test kits compared with strengthening the linkages between PMTCT and ANC services ($21/$100). Thus, this qualitative analysis indicates that the current country priority lies in improving the second half of the cascade in terms of improving the proportion of pregnant women

engaged (tested positive) to initiate PMTCT. Inevitably, however, to successfully decrease the mother-to-child transmission rates, the country must bolster its efforts to identify as many pregnant women who are HIV-positive and put them on treatment as soon as possible.

Sero-discordant Couples

Epidemic Overview

Since MOT model does not take into account discordant couples, there are no estimates on the total number of sero-discordant couples in Ghana. However, according to estimates generated by GAC, a significant proportion of infected couples are sero-discordant (77.9%) (7). More importantly, it is estimated that a majority of concordant positive couples were discordant at some point during their co-habitation.

Majority of concordant positive couples in Ghana were discordant at some point during their relationship. Scaling up CHTC to identify sero-discordance could therefore potentially reduce HIV transmission significantly among heterosexual stable couples.

Gaps in current strategies and challenges to future scale-up

While the 2011-2015 NSP provides guidelines on targeting sero-discordant couples with HIV prevention services, Ghana has yet to implement robust prevention activities for this population. Furthermore, as highlighted by stakeholders in the key informant interviews, stigma and discrimination is one of the main barriers in expanding couples HIV testing and counseling (CHTC). This is further complicated due to cultural mores and conventions, namely the practice of polygamy, which according to key informants is not uncommon in Ghana. Stakeholders suggested that HIV positive women are even less likely to inform their partners and/or seek CHTC if they are in a polygamous relationship due to concerns related to maintaining the relationship. Furthermore, since men do not participate actively in ANC in Ghana, they are less likely to receive CHTC as part of ANC efforts. While it is clear that guidelines outlined in the 2011-2015 NSP need to be implemented across the country, stigma and discrimination against PLHIV means that initiating CHTC will remain a challenge in Ghana.

Not surprisingly, when asked to complete the hypothetical budget exercise, key informants ranked focused advocacy to reduce stigma and discrimination and provision of ARV prophylaxis as the two main priorities among direct interventions for sero-discordant couples ($23/$100) (Results budget exercise can be viewed in Annex B: Cascade Diagrams & Budget Exercise). Stakeholders also highlighted the importance of ensuring that women in sero-discordant couples, regardless of their HIV status, have access to Reproductive Health and Family Planning services.

Over 75% of Ghana's infected couples are sero-discordant. NSP provides clear guidelines to target sero-discordant couples with HIV prevention services, but CHTC remain very low.

Recommendations

1. **Focused strategies to reach sero-discordant couples:** Sero-discordant couples have been extremely hard to reach due to stigma and discrimination. While one possible solution to increase coverage within this population is through CHTC within ANC services, it has been hard to achieve due to a minimal take-up of CHTC.

People Who Inject Drugs

Epidemic Overview

There are currently no accurate estimates either for the total number of People Who Inject Drugs (PWID) in Ghana or the HIV prevalence within this target population. While some stakeholders theorize that PWIDs may have very high rates of HIV, there is a lack of robust evidence in support of this claim.

Some reports on PWID in Ghana hold that there are approximately 6,786 PWID in Ghana, referencing a 2013 study conducted among prisoner populations (7). However, national estimates extrapolated from prisoner populations are problematic for several reasons. For instance, only 0.6 percent of inmates reported using drugs prior to being incarcerated and only 2 of 3 inmates who reported drug use prior to imprisonment mentioned sharing needles. Additionally, drug users (including those who inject drugs) might be more vulnerable to being imprisoned due to behavioral, structural, and social factors. There is, therefore, a high likelihood of selection bias. Consequently, the estimates of PWID in Ghana could be considerably over-estimated.

Gaps in current strategies and challenges to future scale

Currently, Ghana has no prevention strategies specifically targeting PWID. While this KP has been included in Ghana's 2011-2015 NSP for Most At Risk Populations, there has been no progress made in implementing programmatic activities to reduce HIV transmission within PWID.

Recommendations

1. **Generate epidemiological data on PWIDs:** Until further research is conducted to accurately estimate the total number of PWID and the HIV prevalence in this group, it is not advisable to invest additional resources to address HIV prevention within this target population. Furthermore, in addition to total number of PWID, efforts should be made to gather information on the location of PWID, demographic characteristics of PWID, and epidemiological trends (for HIV and other diseases such as TB and viral hepatitis).

General population, Adults

Epidemic Overview

As mentioned earlier, Ghana is experiencing a generalized HIV epidemic with prevalence of approximately 1.3 percent among the general adult population (8). While Demographic and Health Survey (DHS) data indicate that knowledge and awareness of HIV is relatively high in the general population, this knowledge does not always translate into behaviors that reduce HIV risk (14). In 2014, only 19 percent of men between the ages of 15-49 with more than one sexual partner reported using a condom during last intercourse in the previous 12 months (15). Even more concerning is the fact that protective behavior with respect to condom use seems to be declining. Condom use among men between the ages of 15-49 dropped from 26.2 percent in 2008 (15).While data for condom use among females was not gathered in DHS 2008, based on DHS 2014 we know that 1 percent of women

Knowledge and awareness of HIV is relatively high in the general adult population. However, this knowledge does not always translate into behavior change. Protective behavior through condom use seems to be declining; in 2014, 11.3% of men aged 15-49 years with more than one sexual partner in the past 12 months reported using a condom during last intercourse - a drop from 26.2% in 2008.

between the ages of 15-49 with more than one sexual partner reported using a condom during last intercourse in the previous 12 months (15).[1]

Another well-known risk factor for HIV transmission is the number of concurrent sexual partners. In 2014, 14 percent of males and 1 percent of females reported having more than one sexual partner in the preceding 12 months (15).

Lastly, the number of individuals who have been tested for HIV and are aware of their status is very low in Ghana although testing has increased considerably among women in recent years. In 2014, 13 percent of females aged 15 - 49 had been tested and were aware of their HIV status in the preceding 12 months, which is a significant increase compared to the 4.1 percent of females aged 15 - 49 in 2008 who had been tested and were aware of their HIV status in the preceding 12 months (8). However, not only has there been no improvement in HIV testing among men, there seems to have been a slight decrease since 2008. In 2014, 6 percent of males aged 15 – 49 had been tested and were aware of their HIV status in the preceding 12 months compared to the 6.8 percent of males aged 15 – 49 in 2008 who had been tested and were aware of their HIV status in the preceding 12 months (8).

It is important to note that HIV prevalence for individuals engaging in casual heterosexual sex is 1.4 percent, which is slightly higher than the HIV prevalence for adults in stable heterosexual relationships (1.1 percent) (13). This trend when combined with the low condom use reported among males with concurrent partners might indicate future challenges for HIV prevention among Ghana's general adult population.

Current Strategies for HIV Prevention

Currently, Ghana's efforts for HIV prevention among the general population focus on improving HTC and ensuring that individuals who test positive are linked with care. BCC interventions focus on abstinence, reducing the number of concurrent partners/promoting monogamy in stable relationships, and correct and consistent condom use. While there have been some demand creation efforts to improve uptake of HTC, as Ghana's epidemic has stabilized and HIV transmission has reduced in the general population, there have been few major HTC campaigns recently. Short supply of test kits also prevented scale-up of HTC campaigns.

Gaps in current strategies and challenges to future scale

The key gaps that need to be addressed to improve the coverage of prevention services in the general adult population in Ghana include:

- HTC in the general adult population is very low. In recent years, there have been no major efforts to improve HCT coverage among adults.
- Given that Ghana's HIV prevalence in the general population is much lower than prevalence within key populations, some KIs reported that they thought it may be politically difficult to increase resources to focus on the general population, especially given reductions in overall HIV funding from external partners.

Recommendations

[1] Data on condom use among females was only gathered for key populations in the 2008 DHS.

Based on interviews with stakeholders, the stakeholder hypothetical budgeting exercise, and analysis of available data, we believe there are two main areas that must be addressed to improve coverage of HIV prevention programs among adults. These include:

1. **Renew focus on increasing HTC uptake in the general population:** While key populations should remain the primary focus in the next NSP, in order to maintain the gains made in recent years, Ghana needs to ensure that sufficient resources and efforts are expended on improving coverage rates within the general (adult) population. Campaigns focused on improving HTC, such as the highly successful "Know Your Status" campaign rolled out in 2008, should be considered for the next NSP.
2. **Improve knowledge and use of condoms and lubricants**
3. **Focus on strengthening SCM of HIV test kits.**

Similar to other target groups, a budget exercise was conducted among stakeholders. Stakeholders' budgetary rankings for direct and indirect interventions were as expected from initial discussion (please refer to Annex B: Cascade Diagrams & Budget Exercise for full results). HTC and STI screening and distribution of condoms/condom-compatible lubricants were ranked as leading direct interventions. For indirect interventions, stable and adequate supply of HIV test kits and strong referral networks were ranked as being most important.

General population, Youth

Epidemic Overview

There are several policies and strategies aimed at addressing HIV prevention among young people in Ghana, including the National HIV/AIDS and STI Policy and the 2011 – 2015 NSP, in which the needs of young people are specifically highlighted. However, despite the positive commitment of the government, translating policy into effective programs and activities has remained a challenge. While HIV prevalence among 15-24 year olds low (approximately between 0.8% - 1.2%)[2], it is important to note that this is one of the few age groups in Ghana where mortality has not declined between 2009 and 2014 (7). Given that youth between 15-24 years are generally at a higher risk for HIV transmission because they tend to engage in shorter relationships with several partners (possibly while also engaging in other risky behaviors), it is important that HIV prevention and treatment programs for the general population in Ghana include interventions specifically tailored to this target population.

Based on the latest DHS conducted in 2014, youth between 15-24 years have less knowledge regarding HIV prevention and are less aware regarding HIV testing services compared to those in older age groups (15). Only 20 percent of young females and 27 percent of young males were aware of HIV prevention methods. For the purposes of the survey, knowledge of HIV was defined as being aware that condom use and sexual intercourse with one uninfected partner are both HIV prevention methods. Additionally, respondents had to know that an otherwise healthy looking person can be HIV-positive and that HIV could not be transmitted by supernatural means or mosquito bites. Similar to other age groups, knowledge of HIV prevention among 15-24 year olds improved with age, education, income status, and urban residence. Lastly, knowledge among males between 15-24 years tended to be higher than their female counterparts(15).

[2] Estimates for HIV prevalence in this age group can vary depending on the definition of "youth". The 2014 MOT estimates that HIV prevalence is 0.8% among 15-19 year olds while other researchers have estimated that HIV prevalence is closer to 1.2% among 15-24 year olds (16.). It is therefore fair to say HIV prevalence among 15-24 year olds is somewhere within the 0.8% – 1.2% range.

With respect to knowing where to get tested, 15-19 year olds are less likely to be aware of facilities where testing services were available compared to 20-24 year olds; while approximately 72% of 15-24 year olds knew where to get tested, only 61% of youth between 15-19 years knew where they could get tested compared with 83% of youth among the ages of 20-24 years(15).

Recommendations

1. Mass media campaigns with a focus on encouraging condom use among sexually active youth and providing information regarding HIV testing services should be implemented. While traditional outreach methods such as radio and television advertisements should be part of the strategy (especially in rural areas), efforts should be made to leverage social networking platforms and mHealth technologies.
2. Special attention should be paid to adolescent females since knowledge of HIV prevention is lower for females in both 15-19 age groups and 20-24 age groups. These might include programs that assist adolescent girls and young women to develop decision-making skills to protect themselves from HIV transmission.
3. Given that HIV knowledge tends to improve with education, prevention efforts should include a focus on youth who are out of school. Additionally, HIV education programs should also focus on improving knowledge among youth in rural areas who appear to have less knowledge of HIV prevention compared to their urban counterparts.

4. RESULTS PART B: ANALYSIS OF THE TREATMENT CASCADE: FROM DIAGNOSIS TO RETENTION

Epidemic Overview

In 2014, approximately 250,000 people were living with HIV in Ghana (17). As outlined in the previous section, HTC has been a key HIV intervention for the national HIV & AIDS response. Ghana seems to have successfully increased awareness of HIV testing, with 79 percent of women and 80 percent of men responding that they know where to get an HIV test. However, within the entire population, only 13 percent of women and 6 percent of men have tested in the last 12 months and received test results (15).

Ghana has increased ART coverage in the last decade and approximately 83,712 people with HIV received ART in 2014 (7, 17, 18). The 2011-2015 NSP set the goal of providing ART to 85 percent of those eligible for treatment. UNAIDS report that Ghana achieved 92 percent retention in 2014, which is significantly higher than other countries in sub-Saharan Africa, which usually range between 70-85 percent(17).

Current Strategies for HIV Treatment

To identify PLHIVs, Ghana has unique set of strategies for HTC based on the target population. These strategies are detailed in the prevention section above. We will simply note here that the 2011-2015 NSP prioritizes increasing testing through PITC and making HTC more easily accessible through community-based couples counseling.

Once an individual knows their status, they are put on the treatment cascade and are "mainstreamed". The Government of Ghana has developed a uniform strategy for care and treatment for all PLHIV. During the 2011-2015 NSP, the general treatment eligibility was CD4 count less than 350/ml^3. In the upcoming NSP, the government plans to set the "90-90-90" goal, where 90 percent of PLHIV will know their status, of

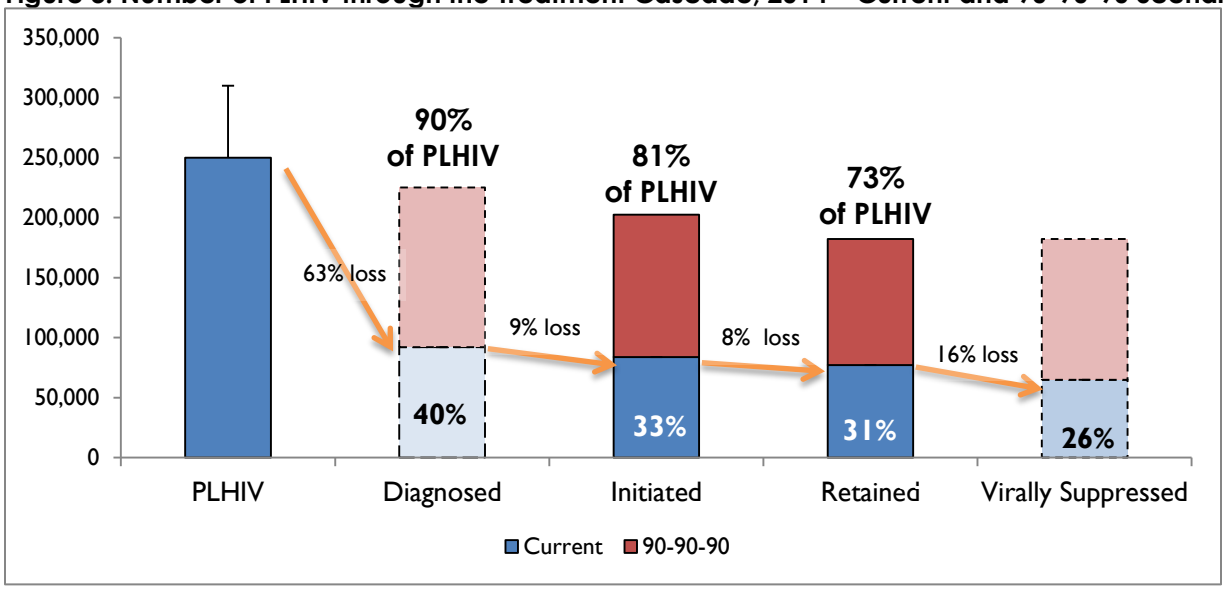
which 90 percent will be on treatment, and 90 percent of those on treatment are virally suppressed. To achieve this goal, Ghana must open up the eligibility criteria significantly, most likely progressing towards "test and treat" approach, where people who test positive are immediately put on treatment regardless of their status of illness.

For treatment retention and viral suppression, the Plan emphasizes the importance of drug resistance monitoring. While retention is high, anecdotal evidence shows that treatment adherence is low.

Challenges to Scale-up

Successful rollout of ART requires that people living with HIV know their status, enroll into care, initiate treatment, be retained on treatment, and ultimately suppress the virus. Figure 3 summarizes the number of people living with HIV and the estimated proportion of PLHIV that are lost within the current treatment cascade for Ghana. A significant portion of the population is currently being lost in the identification step. Also, while no study has been conducted on the rate of viral suppression, anecdotal evidence shows that many people on treatment do not adhere to them, lowering the chances of viral suppression. The following section highlights the key policy and health systems challenges that are currently limiting Ghana from scaling up its treatment efforts. These issues are also summarized in the treatment cascade in Annex B: Cascade Diagrams.

Figure 3. Number of PLHIV through the Treatment Cascade, 2014 – Current and 90-90-90 Scenario



Source: (17, 19)Author estimates for population lost for diagnosis

Identification of PLHIV through Diagnosis

Currently, we estimate that over 60 percent of PLHIV (approximately 150,000) do not know their HIV status. As noted in previous sections, **stigma and discrimination** hamper people's willingness to get tested for HIV. Given the low testing rate for the entire population, it is likely that significant portions of the PLHIV population are not aware of their HIV status**.** Key informants highlighted how the **BCC campaigns** have had mixed effects with recent reduction in funding. Consistent and targeted efforts may

be required to maximize the investments made in BCC. Concurrently, policy efforts to change the **legal status** of key populations would be critical in reducing stigma and discrimination as well as the fear among those populations to access care. While the key informants highlighted policy initiatives in this area to be valuable to address the diagnosis gap, it is not a strategic activity within the 2011-2015 NSP.

While Ghana has successfully increased its service delivery points over the last few years, according to KIs, efforts to ensure that there are quality **providers trained in HTC and ART** still need improvement. While the idea of establishing a task shifting policy was highlighted by KIs as an innovative way of overcoming human resource/access point shortage, this activity is not featured in the NSP 2011-2015. It prioritizes **commodity security** and **strengthening of the supply chain** to prevent stock-outs. Stakeholders disagreed whether there has been improvement in supplies of HIV test kits, and the varied modes in which HTC is conducted (at facilities, at workplaces, and in communities) continues to present challenges in streamlined and consistent flow of commodities to the necessary locations.

Linkage to Care and Treatment Initiation

There are no data currently available on how many people are actually effectively linked from testing site to an ART service delivery site. There is general consensus that more effort must be placed in systematizing **referrals** and implementing a client-centered system to ensure uninterrupted care for PLHIVs.

Retention

Limited evidence indicates that treatment retention rate is high. The UNAIDS Annual Report notes that 71 percent of the population on treatment were retained in 2010. This is a significant achievement, given the lack of any system to track PLHIV. KIs noted that the current system limits the provider's ability to share information with community outreach workers, reducing ability for PLHIV follow-up.

Viral Suppression

Financial constraints limit the ability of patients, especially women, to access health services consistently (16), while ART **stock-outs** or shortages at the clinic were also mentioned as causes of treatment gap. **Lack of knowledge** continues to be a barrier even after treatment initiation – 23 percent of participants in a qualitative study conducted in 2014 had incorrect understanding of ART effectiveness, and mentioned this misperception as reason for discontinuing treatment(20). Due to these prevalent treatment gaps, it is likely that most patients on treatment still struggle to achieve viral suppression.

Lab monitoring is critical to ensure patients are initiated on treatment as soon as they are eligible. However, supply chain and health information system barriers (further detailed in the paragraph below) seem to hinder its programmatic success. ARV shortages were highlighted as third most critical reason for gaps in treatment (20).

Critical to the treatment cascade is to make sure that patients are tracked through the health system. The 2011-2015 NSP prioritizes setting up a strong, **integrated health information system**, but key informants noted that there is still lack of data available.

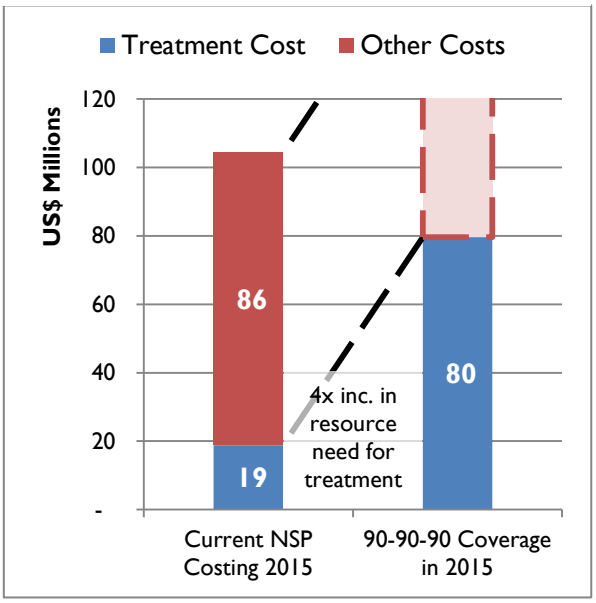
Strong **care and support** so that patients can have productive and healthy lives are necessary to motivate them to stay on treatment. The NSP 2011-2015 highlights several strategies to institutionalize care and support for PLHIV, and KIs noted that the country is doing relatively well in implementing these strategies. However, there are no interventions conducted around financial support for PLHIV, an issue highlighted in the recent qualitative study on retention to treatment as major reason for treatment gap (20).

Financial Gap Analysis to Achieve 90-90-90 Goal

Based on the unit costs used by the NFM proposal, it will cost approximately US$80 million to put 81 percent of adult and pediatric HIV patients on treatment as well as 95 percent of HIV-positive pregnant women on PMTCT. This value is more than four times the amount costed for 2015 in the current 2011-2015 NSP and will account for almost 60 percent of the US$137 million funding envelope currently available per year according to the NFM proposal (5). Significantly more resources must be mobilized so that sufficient funds remain for prevention and supporting services such as administration, monitoring, and strategic information.

One must also note that even if such significant resource mobilization was successful, unless the country addresses the health systems and policy gaps in identifying PLHIV, put them on treatment, and keep them on treatment, it will not achieve its ultimate goal of achieving viral suppression.

Figure 4. 2011-2015 NSP costing compared to funding need for 90-90-90 coverage in 2015



Recommendation

1. 90-90-90 goal requires financial resources and program efficacy to get people on treatment and keep them on treatment to achieve viral suppression. Currently, the country is already facing challenging in putting people who are eligible on treatment. Ghana must redouble its efforts in resource mobilization so that treatment can be scaled up and sustained into the future.
2. As indicated in the prevention section, dedicate resources to increase uptake of HTC, especially through targeted BCC efforts and increased capacity among providers to initiate counseling and testing. It is impossible for the country to achieve the 90-90-90 goal unless more people test for HIV and know their status.
3. Establish a client-based system for monitoring PLHIV so that the health facility and community outreach workers can appropriately track and follow-up with patients so that they are not lost throughout the cascade.
4. Ensure adequate emphasis is placed on care and support for PLHIV, with a program that addresses the financial barriers faced by them throughout the treatment cascade.
5. Conduct further quantitative and qualitative studies to understand the causes of patient loss through the treatment cascade, especially around testing, treatment adherence, and viral suppression success rate.

5. RESULTS PART C: MODELING ANALYSIS TO ASSESS IMPACT OF PRIORITIZED PROGRAM

Model Assumptions

ART and PMTCT coverage scenarios are entered in to the AIDS Impact Model (AIM). Combined with prevention/behavioral intervention coverage entered into the Goals model, the Spectrum suite projected the impact of three coverage scenarios through 2020: (1) NSP Target Scenario; (2) Cascade-constrained/ Realistic Target Scenario; and (3) Fiscal Space Targets Scenario. Description of each scenario and the assumptions made in the coverage targets our detailed below. The model inputs are summarized in Table 1.

Scenario 1: NSP Target Scenario

Scenario 1 assumes that the prevention and treatment coverage increases at an expedited rate so to achieve the NSP Targets. While the 2016-2020 NSP targets are yet to be formalized, for this exercise, we assumed an aggressive increase in coverage over the course of the five years based on the following assumptions. For treatment, Ghana is planning to adopt the 90-90-90 goal in which 90 percent of people living with HIV will know their status, 90 percent of those who know their HIV positive status will be on treatment, and that 90 percent of those on treatment are virally suppressed. Thus, this first scenario assumed that the treatment coverage will increase progressively from 48 percent to 81 percent coverage for the entire PLHIV population (90 percent of 90 percent) by 2020. Ghana has already achieved 87 percent coverage of PMTCT Option B, thus we assumed an immediate switch to Option B+ and 95 percent coverage achieved from 2016 through 2020.

For prevention activities, NFM proposal (which covers 2015-2017) was reviewed to set the baseline for 2015 and identify NSP targets for 2016-2017. If the coverage was expected to increase over these three years, we assumed that the increasing trajectory will continue through 2020 (applied to FSWs, MSM, and HTC for general population). In the case of condom coverage, which was not expected to increase beyond 8.7 percent during 2015-2017, we kept the coverage static at the same rate.

Scenario 2: Cascade-constrained/ Realistic Target Scenario

Scenario 2 incorporates the programmatic constraints identified throughout the prevention and treatment cascade to demonstrate that coverage growth may be hampered by the identified programmatic barriers. Treatment coverage planned under this scenario expects that due to significant health systems and policy barriers around identification of PLHIV, including challenges in high-level enabling factors – notably stigma and discrimination combined with stock-outs of HIV test kits – only 25 percent of NSP year-on-year scale-up will be achieved for adults. Furthermore, as pediatric patients are known to be harder to identify in various country context, this scenario assumes that only 50 percent of NSP year-on-year scale-up will be achieved for pediatric patients. On the other hand, there were no significant barriers identified for PMTCT, and given the high coverage already achieved by the country, the scenario set 95 percent coverage throughout the projection years, but with expedited transition to Option B+ rather than immediate switch; in this scenario, Ghana is expected to transition to 100% Option B+ by 2017.

For prevention efforts, the KIs suggested that while the FSW program has been successful, there is little commitment currently to significantly scale-up the program. Thus, the ambitious scale-up from *Scenario 1* was taken down to a gradual accent from 78 percent in 2014 to 85 percent by 2020. For MSM, however, KIs indicated that there seems to be significant political will to scale-up the program. However, without any progress on stigma and discrimination, the demand for the services will be low. Thus, we assumed

that only half of the population will be reached by 2020. For HTC and condoms, KIs suggested that there may be general unwillingness to devote significant new resources to general population activities given the size of this group. While HTC will likely grow slightly with continued provider training, condom supply and demand will likely stay static without further political commitment.

Scenario 3: Fiscally-constrained Scenario

Scenario 3 set the coverage targets based on what could be achieved given the resources currently available for HIV programs. According to the Global Fund concept note, US$411,672,372 was available for 2015-2017 period including US$88,503,655 funded through the Global Fund. Alternative resources include funding from the Government of Ghana, US Government, and the United Nations. Given the restrictions placed upon each funding source (e.g. US Government does not fund treatment services), coverage estimates were set according to the resources available. We assumed that the funding will plateau between 2018 and 2020 at the 2017 level, to model the impact on programs if no additional resources are mobilized. Under the Global Fund proposal, prevention and treatment targets increase over the 2015-2017 period. Thus, the coverage was increased accordingly. Ethically, these gains in coverage must be sustained through other sources of funding after 2017; therefore, we have maintained the number on treatment at these levels accordingly. Funding for administration, health systems strengthening, community systems strengthening, and other support services such as strategic information were reduced accordingly to accommodate the targeted coverage increase committed under the Global Fund proposal. Detailed description of the approach taken to develop the funding envelope and the coverage for *Scenario 3*, including the unit cost used, can be found in Annex C.

Table 1. Coverage Assumptions for Goals Modeling Interventions

1. NSP Target Scenario						
Intervention	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**
ART*	105,599	128,887	149,038	172,340	199,284	208,522
PMTCT*	15,446	19,417	19,861	20,322	20,801	21,299
FSW	80%	85%	90%	90%	90%	90%
MSM	80%	85%	85%	88%	90%	90%
HTC	17%	19%	21%	24%	28%	32%
Condoms	9%	9%	9%	9%	9%	9%
2. Cascade-Constrained/ Realistic Target Scenario						
Intervention	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**
ART*	99,877	117,093	131,957	148,123	167,022	172,641
PMTCT*	15,446	19,417	19,861	20,322	20,801	21,299
FSW	79%	81%	82%	83%	84%	85%
MSM	37%	40%	42%	45%	47%	50%
HTC	10%	10%	10%	10%	11%	11%
Condoms	9%	9%	9%	9%	9%	9%
3. Fiscally-Constrained Target Scenario						
Intervention	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**
ART*	84,633	99,691	114,749	114,749	114,749	114,749
PMTCT[1]*	15,446	19,417	19,861	20,322	20,801	21,299
FSW	77%	82%	87%	87%	87%	87%

MSM	64%	72%	75%	75%	75%	75%
HTC	9%	9%	9%	9%	9%	9%
Condoms	9%	9%	9%	9%	9%	9%

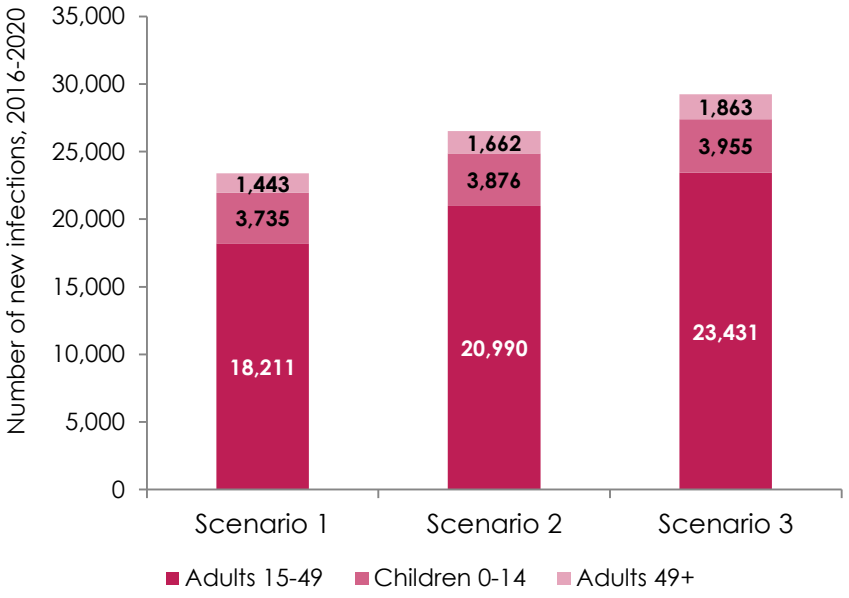
[1] PMTCT need was set based on the data presented in the NFM proposal and increased incrementally between 2018 and 2020. However, due to differences in the expected birth rate in Spectrum as compared to the population projections used by the Government of Ghana, the total need exceeded total population of HIV-positive pregnant women in Scenario 3. * ART and PMTCT were entered in the model as absolute values, whereas prevention coverage was entered as percentages.

Health Impact

New HIV Infections

The numbers of new HIV infections for the scenarios modeled in Goals are shown in Figure 5. Under *Scenario 1: NSP*, the total number of new HIV infections across age groups over the 2016-2020 NSP period (modeling calendar years) is about 23,390, dominated by incidence in the adult and adolescent, sexually active population (15-49 years). The total number of infections increases across Scenarios 2 and 3 from this base. *Scenario 3*, which has the lowest numbers of persons reached annually with ART and lowest coverage on key prevention interventions, has total new infections of 29,250, an excess of approximately 5,860 infections over Scenario 1. Underlying these results is the finding that annual infections among children (not shown in the figure) decline sharply over time as PMTCT coverage scales up and is based on rapidly increasing Option B+ adoption as discussed above. The estimated MTCT rate at 6 weeks declines across all scenarios from an estimated 3.1 percent in 2015 to 1.6 percent by 2017 with full adoption of Option B+, and remains at this low level till the end of the upcoming NSP.

Figure 5. Projected total new HIV infections (all ages) by scenario, 2016-2020



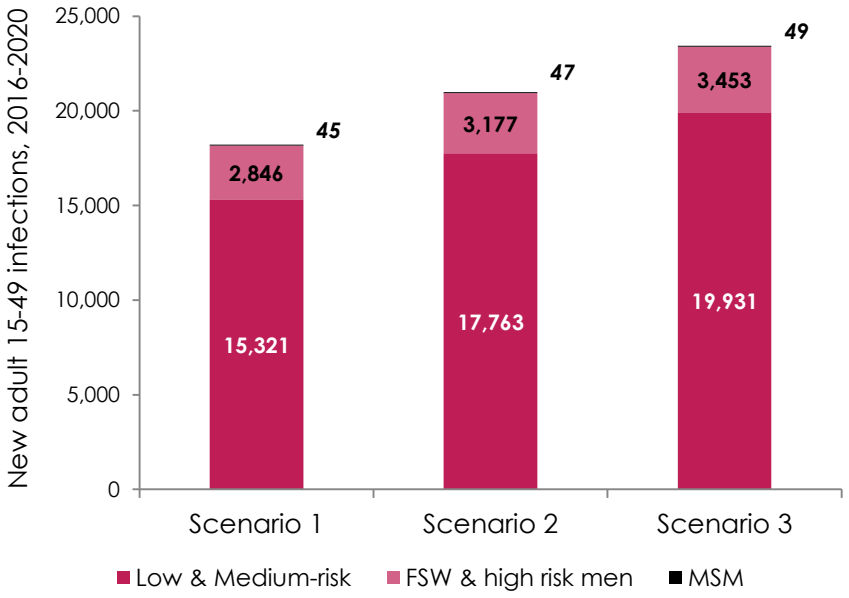
Source: Authors' analysis

We also examined the numbers of new HIV infections for the adult population aged 15-49 years separately, disaggregating to the underlying risk groups involved in the Goals analysis. Methods for the selection of these risk groups and their definition here follow the previous investment case study (1). Medium-risk heterosexuals include those with casual heterosexual partnering relationships and stable

partners of clients of sex workers. This definition makes the results comparable to the 2014 MOT study. Figure 6 below shows the results of the new modeling.

Across all scenarios, low and medium risk heterosexuals, male and female, contribute about 84 percent of the new adult infections over the period 2016-2020, which is similar to previously reported results (1). Under *Scenario 1: NSP*, the total number of new HIV infections in the adult age group is about 18,212. Again, the infections increase across Scenarios 2 and 3. *Scenario 3* has total new adult infections of about 23,433, an excess of approximately 5,221 infections over Scenario 1. The infections among MSM do not vary significantly across scenarios, while the incidence in FSW and clients is considerably higher in Scenarios 2 and 3, which follows the lower coverage assumed in these scenarios.

Figure 6. New HIV infections among adults 15-49 years, by scenario, 2016-2020

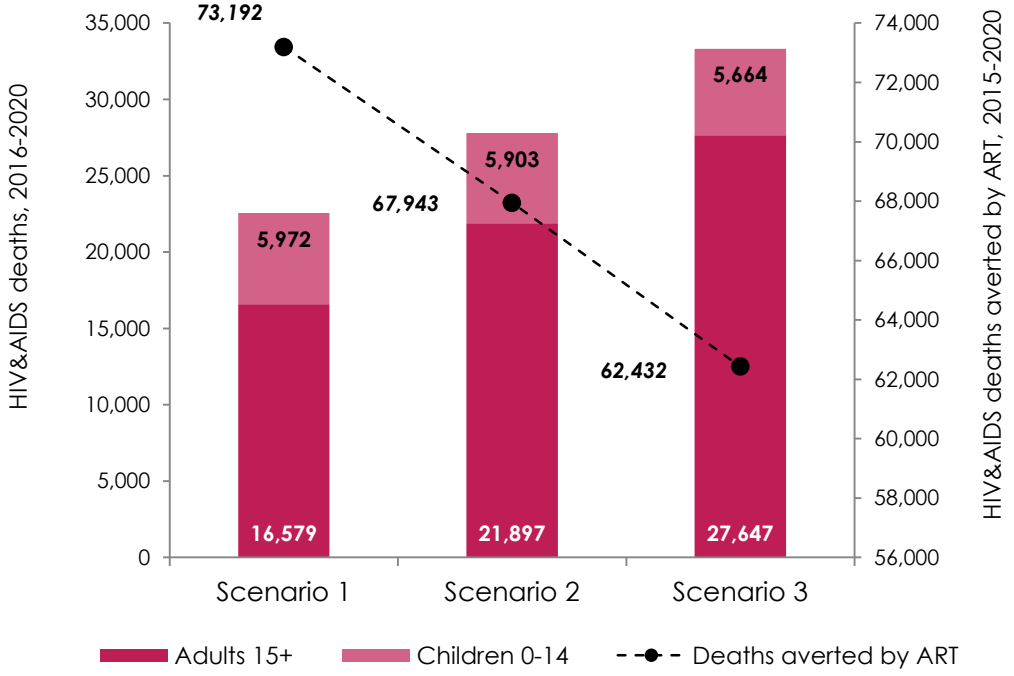


Source: Authors' analysis

AIDS-related mortality

Under *Scenario 1*, AIDS-related deaths are projected to total 22,551 over 2016-2020 (Figure 7). With reduced numbers reached by adult and pediatric ART under the other two scenarios, AIDS-related deaths increase and the deaths averted by ART reduce. Therefore, achieving the new NSP targets compared to *Scenario 3* would reduce total mortality for the NSP period by 10,760 over 2016-2020, a reduction of 32 percent overall. Comparing *Scenario 1* to *Scenario 2*, the comparable reduction in mortality from reaching the new NSP targets for ART is 19 percent.

Figure 7. Projected number of total AIDS-related deaths and deaths averted by ART, by scenario, 2016-2020



Source: Authors' analysis

6. DISCUSSION

A comprehensive HIV strategy is composed of complementary and appropriate prevention, treatment, and mitigation activities. All components are necessary to prevent further infections while prolonging and improving the lives of those living with HIV. Within a resource limited setting, investments into each of these three components must be targeted towards interventions that will address the most critical issues to achieve the most impact. The prioritization analysis conducted in this study modeled the health impact of various policy scenarios made in the level of effort placed on prevention and treatment interventions. In the process, the study identified opportunities for improving efficiencies and efficacy of the prevention and treatment programs so that coverage may increase despite limited resource envelope. The Government of Ghana and stakeholders can use this data to inform the priorities placed in the upcoming 2016-2020 NSP.

Making Strategic Choices

How should government and key stakeholders prioritize the allocation of limited funding? *Scenario 3* modeled this fiscally-constrained environment; our process to develop the coverage scenario detailed below and further more in Annex C should be a guide for the Government of Ghana and its stakeholders as they consider the priorities for the upcoming 2016-2020 NSP.

Funding for treatment should be earmarked first. This step is essential because funding must be made available at least to keep those who are on treatment can remain on treatment. Treatment also has the secondary benefit of prevention, as it reduces the chances of the PLHIV from passing on the infection to others. Thus, if possible, priority should be placed in increasing funding for treatment so that coverage can be scaled-up.

With the remaining funding, prevention should be considered next. This prevention funding must further be allocated between the KPs and the general population. From an epidemiological perspective, since there are still a large number of infections happening within the general population, investments to increase coverage for both KPs and general population are important. However, realistically, achieving coverage rate for the general population that is close to what has already been achieved within the KPs will require funding well beyond what is currently feasible in Ghana. Thus, we recommend that efforts be placed first to scale-up coverage for KPs so that Ghana can continue progressing in its fight against HIV. With the funding that is left, focused efforts should be made to target general population interventions. Following KPs, there is a need to invest in case identification through HTC services targeting the general population, where the majority of the infections are found, essential to reach 90-90-90 targets. Stakeholders should make a data-driven decision on how to target the condom and HTC programs within the general population to improve program efficacy.

Once the key interventions for prevention and treatment are covered, the funding then can be allocated to supporting services, such as health systems strengthening, M&E, strategic information, and administration. As our cascade analysis shows, the success of the key interventions depends often on the supporting services. On the other hand, with this necessary prioritization approach, funding for supporting services will be limited the most. Thus, it is critical that these support services gain efficiencies and improve its efficacy so that more can be done within the limited resources available. In the following section, we highlight priority interventions that have high likelihood of improving outcomes in the most efficacious and efficient manner.

Doing More with Less – Prioritizing Supporting Interventions

National strategies must be grounded on what can be achieved in reality, rather than a laundry list of wishes. Within the resource limited setting, decision makers may need to make difficult decisions on funding one program over another (as covered in the previous section). At the same time, once they clarify the key interventions to prioritize, they must also consider how they can improve the efficiency and efficacy of their programs so that coverage may increase despite plateaued funding.

The prevention and treatment cascade analyses brought to light the key bottlenecks unique to each target group. Major barriers are the steps in the prevention or the treatment cascade where target populations are being lost. Accordingly, prioritizing these direct and indirect interventions within the upcoming NSP will likely set up the Ghanaian health system and the policy environment to achieve the NSP goal.

However, there were several key populations whose prevention efforts will likely come at a significant cost or are highly unlikely to be implemented. Investing in a large and/or complex program that covers the entire target population to identify and reach a small group of PLHIV can be costly and politically unpopular. On the other hand, in a country with a generalized epidemic, the fight on HIV cannot be won without covering those who are hard to reach. The limited coverage that can be achieved in *Scenario 2* exhibits this point. When resources are limited, policy makers must strike a delicate balance between targeting low hanging fruits that have high immediate impact with more difficult, yet essential interventions that will allow the country to end of the epidemic. To facilitate this prioritization process, Table 2 lists the priority interventions as highlighted in the previous NSP and by KIs, the interventions' current strength of evidence for success based on global best practice and as applied in Ghana context, and ultimately the study's recommendation for the upcoming NSP for each target population.

Table 2. Recommended Supporting Interventions by Target Group

Target Population	Current Interventions	Strength of Evidence to Support Prioritization of Interventions in the New NSP	Recommendation for Future NSP
Prevention			
FSW	Distribution of condoms/ condom compatible lubricants	**Strong** – condom distribution and use is necessary for infection prevention[#]	• Continue investing in the PE program • Ensure commodity security and distribution of condoms and HIV test kits • Prioritize evaluation of current programs and develop clear strategy based on evidence
	Strengthen/ expand PE program	**Strong** – program has historically been successful[+§]	
	Improve DIC access	**Weak** – there is lack of evidence that DICs increase access to HIV services for FSWs [+§]	
	Advocacy to reduce stigma and discrimination	**Weak** –efforts placed by current strategy has been low, and data is lacking on successful approaches to stigma reduction[+§]	
	Improve SCM of HIV test kits	**Medium** – stock-outs have been an issue, although this intervention must be coupled with demand-side interventions[#§]	
MSM	Distribution of condoms/ condom compatible lubricants	**Strong** – condom distribution and use is necessary for infection prevention[#]	• Adopt new approaches to reach MSM taking into account widespread stigma and discrimination • Focus efforts on gathering additional data on MSM
	Expand PE program	**Medium** – Current PE program is of high quality, but further improvements must be made to reach more of the target population[§]	
	BCC campaigns to reduce stigma and discrimination	**Medium** –BCC efforts are necessary to overcome stigma and discrimination, but insufficient data is available to improve the efficacy of the message[+]	
PWID	n/a – Currently, no interventions specific to this target group is being conducted	**Weak** – there are no population-based data on PWID size; no high impact interventions implemented nor prioritized in strategy[+]	• Focus on developing evidence base for epidemic within this target group
PMTCT	Train more health workers on PITC	**Strong** – ANC adoption is high in Ghana, so ensuring PMTCT uptake during ANC is critical[#+]	• Achieve PMTCT scale-up potential through increased training of health workers in ANC clinics • Strengthen SCM of HIV test kits
	Strengthen SCM for HIV test kits	**Strong** - Test kits are necessary for identifying HIV+ pregnant women[#]	
Sero-discordant Couples	BCC campaigns to reduce stigma and discrimination	**Medium** – While the need for such intervention is clear based on the infectivity within the target group, there is little data available since this group is not identified as a key population by the strategy[#+]	• Continue expanding CHTC, prioritizing efforts through the ANC
	Train health workers on CHTC within ANC settings	**Strong** – Within a highly stigmatizing environment, build on ANC programs that have good reach, to expand acceptability of CHTC[#§]	
General	Targeted BCC for HTC	**Medium** – High awareness must be translated to	• Implement improved BCC

Population (Adults)		action, but current program has placed little effort in innovating HTC campaigns[+§]	campaigns focused on HTC
	Improve referral systems between PHC and ART sites	**Weak** - no current evidence exists around efficacy or barriers to referrals for ART initiation[+]	
Treatment			
All Population (Mainstreamed) & Cross-cutting	Expand provider training, esp. on PITC	**Medium** – Intentional provision of HTC is critical, but must be coupled with demand creation[#+§]	• Scale-up VL monitoring and use data to measure progress towards 90-90-90 • Strengthen HMIS and improve data sharing to enable PLHIV tracking and analyze data on how PLHIV are lost in the cascade • Ensure appropriate focus remains on care and support for PLHIV • Generate evidence-base to improve BCC campaigns ultimately to increase HTC uptake and treatment adherence
	Task shifting to inc. access to HTC	**Medium** – Efficacy of task shifting to improve access is globally accepted, but no initiative currently present in Ghana[#§]	
	Advocacy to reduce stigma and discrimination	**Medium** – Most important barrier to address for identification, yet evidence on BCC and policy change currently not available[+§]	
	Routinize lab monitoring, incl. viral load	**Strong** – VL data is key to measure progress towards 90-90-90[#+]	
	Institutionalize care and support programs	**Medium** – Strong care and support program improves adherence[+§]	
	Strengthen HMIS to enable patient tracking	**Strong** – There is a lack in ability of the current program to prevent patient loss through the cascade[+§]	

[#] Global best practice. [+] Author assessment based on literature review. [§] Assessment based on key informant interviews.

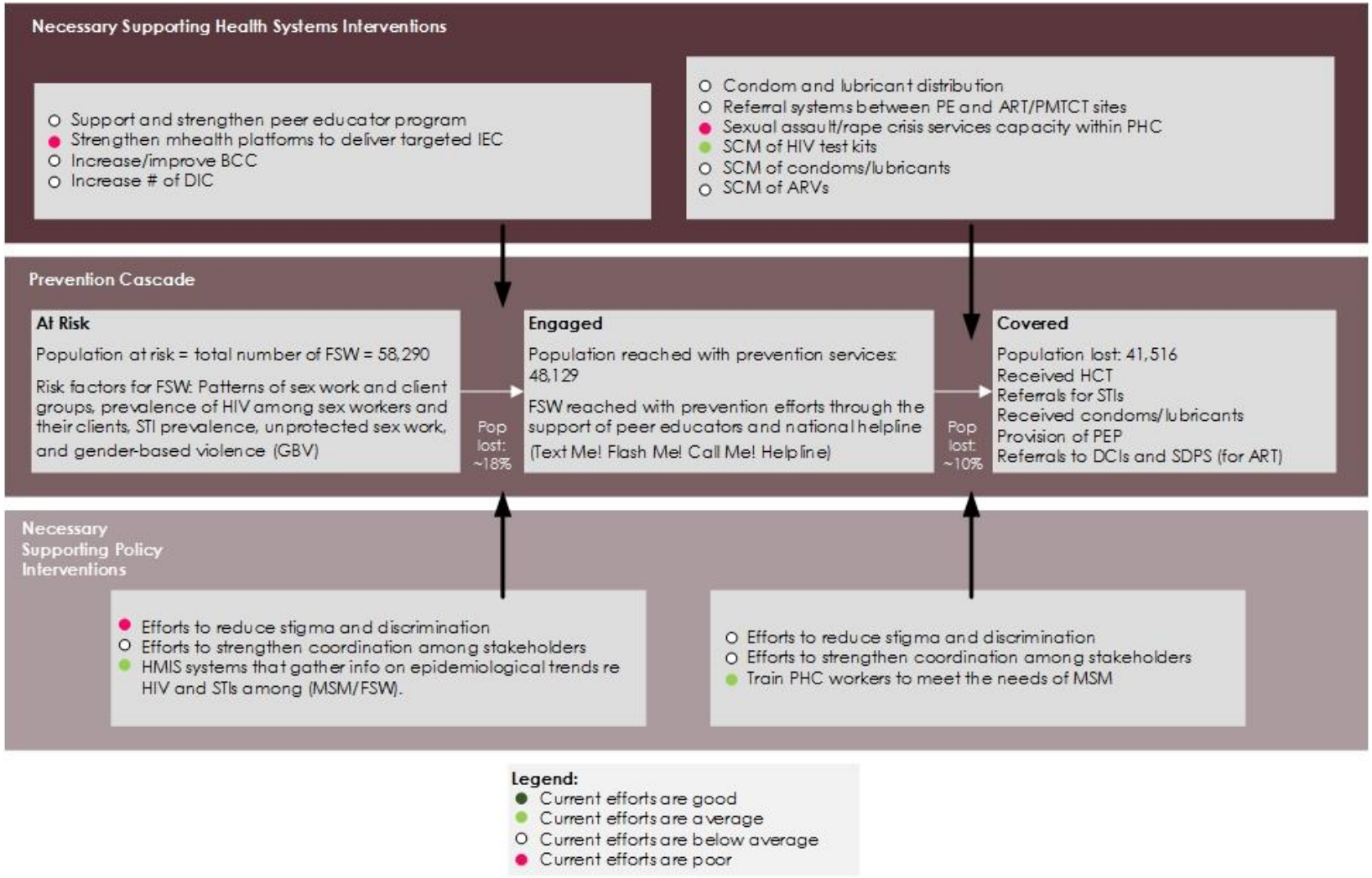
ANNEX A: METHODS ANNEX

Figure A1. Framework for Qualitative Review Part A (prevention efforts)

Source: Authors

ANNEX B: CASCADE DIAGRAMS & BUDGET EXERCISE

Figure B1 Prevention Cascade for Female Sex Workers in Ghana



Source: Authors, (10)

Table B1. Stakeholder Priorities: Direct & Indirect Prevention Interventions for Female Sex Workers

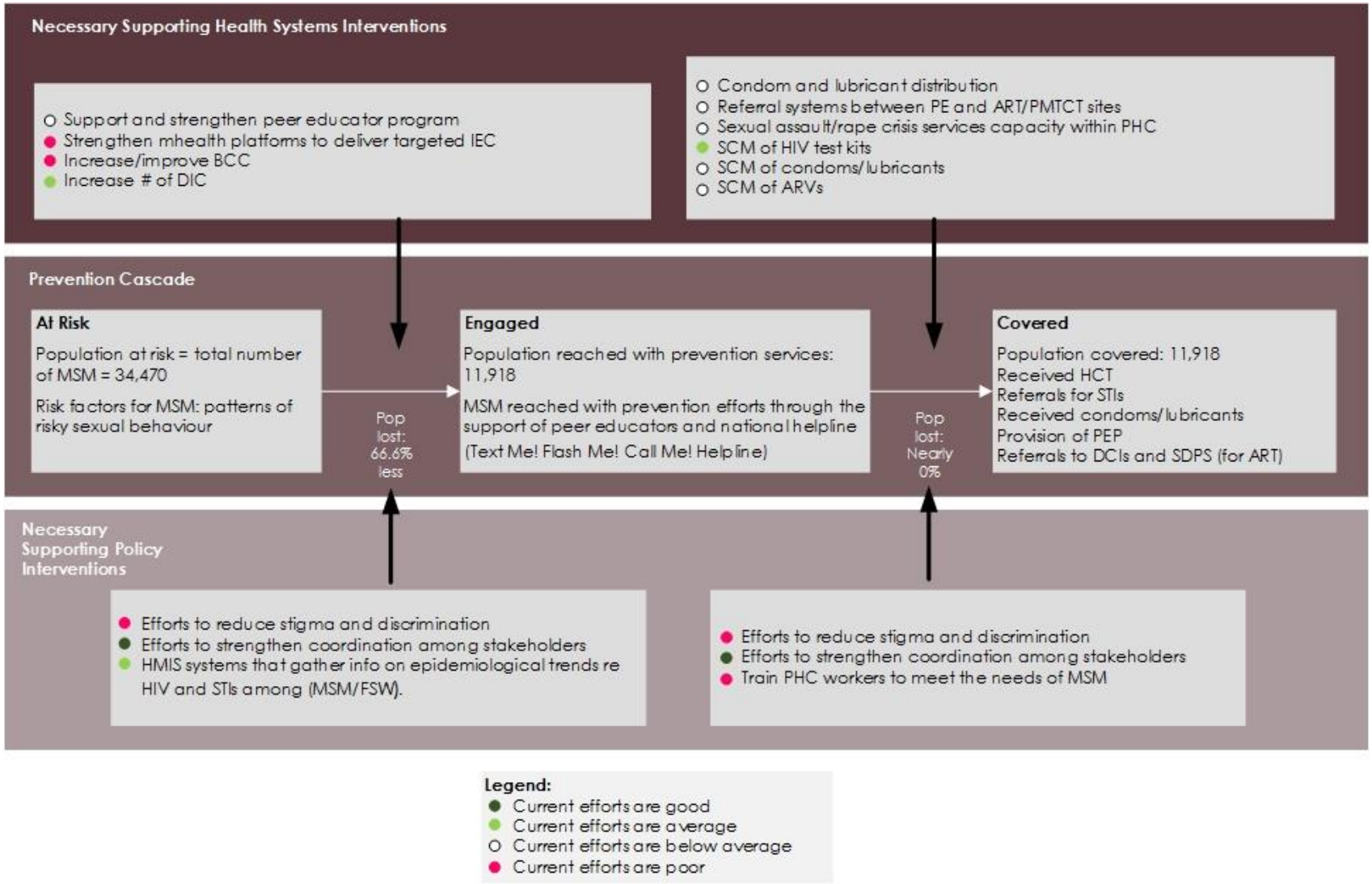
	Direct interventions		Indirect interventions	
Allocation within direct activities versus indirect factors	Distribution of condoms/ condom compatible lubricants	$17	Focused advocacy to reduce stigma and discrimination (to encourage couples to test their HIV status)	$10
	Strengthen/expand PE prog for FSWs	$13	SCM of HIV test kits	$8
	Targeted BCC for FSW	$11	Improve referral systems between DIC and ART sites (to link FSW with ARVs)	$8
	Increase # of Drop In Centers (DIC) for FSW	$10	SCM of condoms/condom-compatible lubricants	$8
	Train additional primary health care (PHC) workers in sexual assault/rape crisis services for FSW	$7	HMIS systems to track epi trends among FSW	$7
Subtotal	$59		$41	
Total	$100			

Source: Authors

Based on information provided by stakeholders on a wide range of prevention interventions, we were able to determine if stakeholder priorities – as indicated by the allocation of hypothetical budget dollars – align with current needs as identified by stakeholders. Strengthening SCM for condom distribution and scaling up the PE program, which were identified as currently lacking adequate effort to meet the needs, received appropriately high allocations in the hypothetical budget exercise. On the other hand, other interventions ranked as being essential to HIV scale-up prevention efforts, such as developing HMIS to adequately track epidemiological trends within this key population, receive only moderate resources from stakeholders.

Overall, it appears that with regards to FSW, stakeholder priorities are in-line with programmatic needs although broader health systems (ex. SCM of condoms) and cultural challenges (ex. stigma and discrimination that prevents FSW from accessing services) might still prevent successful scale-up of prevention efforts among FSW.

Figure B2 Prevention Cascade for Men Who have Sex with Men



Source: Authors

Table B2. Stakeholder Priorities: Direct & Indirect Prevention Interventions for Men who have Sex with Men

	Direct interventions		Indirect interventions	
Allocation within direct activities versus indirect factors	Distribution of condoms/ condom compatible lubricants	$13	Focused advocacy to reduce stigma and discrimination (to encourage MSM to access HIV services)	$14
	Increase # of Drop In Centers (DIC) for MSM	$12	Improve referral systems between DIC and ART sites (to link MSM with ARVs)	$11
	Strengthen/expand PE prog for MSM	$12	SCM of HIV test kits	$10
	Targeted BCC for MSM	$11	SCM of condoms/condom-compatible lubricants	$10
			HMIS systems to track epi trends among MSM	$9
Subtotal	$48		$55	
Total	$100			

Source: Authors

When asked to allocate hypothetical budget dollars to direct and indirect activities that support prevention efforts targeted at MSM, stakeholders allocated a higher proportion of funds to indirect interventions compared to direct interventions. MSM are the only target group where we see higher proportion of funds allocated to indirect activities. This is presumably because focused advocacy to reduce stigma and discrimination is categorized as an indirect intervention in our budget exercise and was repeatedly underscored by stakeholders as the biggest barrier to reaching the MSM population with prevention services. However, despite the importance of stigma and discrimination highlighted by stakeholders, advocacy to reduce stigma and discrimination only received a slightly higher allocation of resources ($14) in the budget exercise as compared to other indirect interventions ($9-11).

Another interesting finding from the hypothetical budgeting exercise for MSM is that stakeholders assigned approximately equal proportions of resources to all direct interventions. Based on interviews, we believe this is because stakeholders felt that all interventions require equal increases in funding.

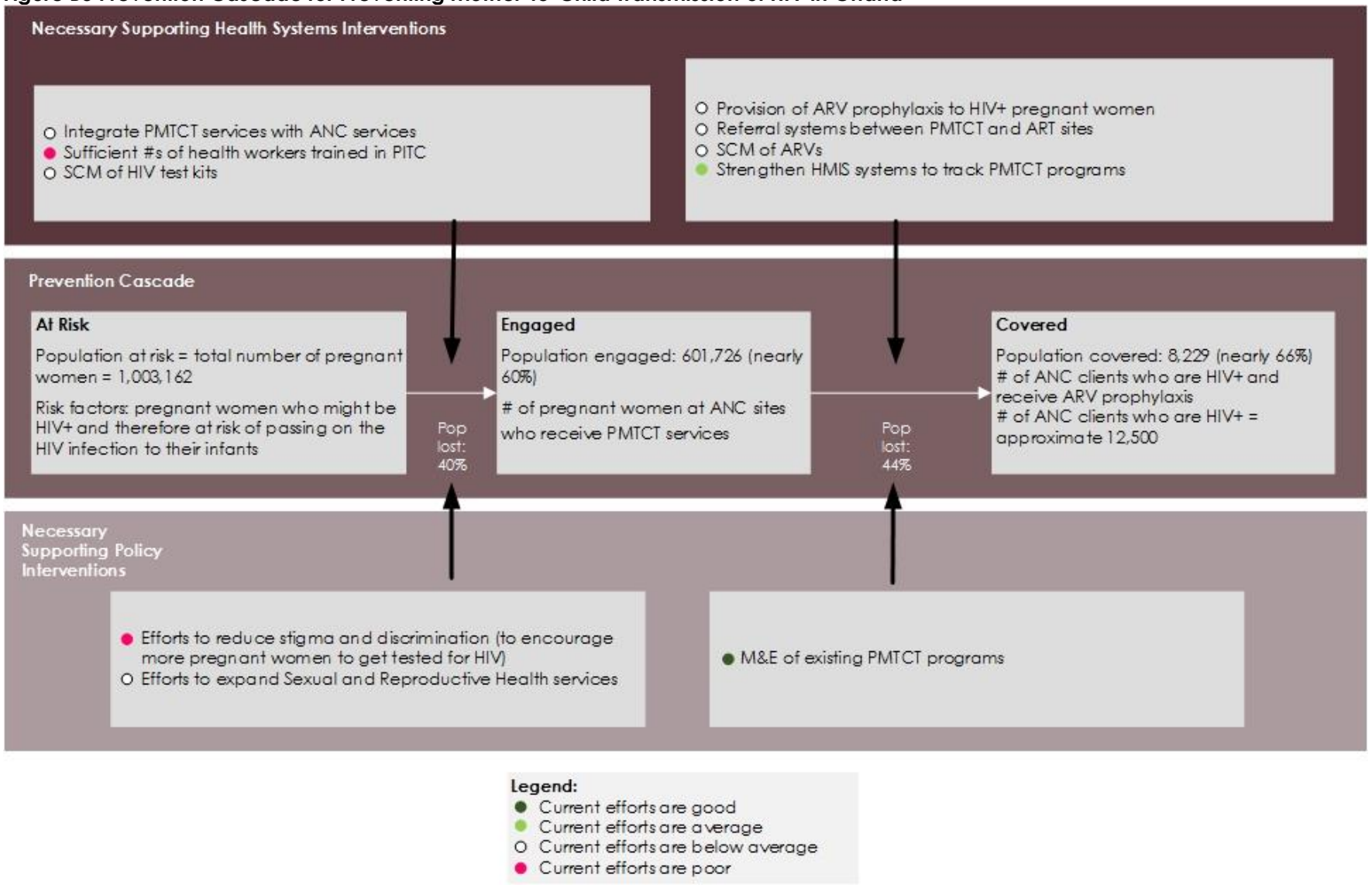
Table B3. Stakeholder Priorities: Direct & Indirect Prevention Interventions for People who Inject Drugs

	Direct interventions		Indirect interventions	
Allocation within direct activities versus indirect factors	Targeted IEC for IDUs	$18	Access to health services for TB/viral hepatitis prevention	$17
	Distribution of condoms/ condom compatible lubricants	$14	Counsellor educator network (modeled after PE prog for FSW)	$15
	Needle/Syringe Exchange Programs	$8	Establish sufficient substance abuse programs	$11
	Provide Medication Assisted Therapy (MAT) for IDUs	$8	HMIS systems to track epi trends in HIV	$8
Subtotal	$50		$50	
Total	$100			

Source: Authors

Priorities that have emerged through hypothetical budget allocations during key informant interviews seem to indicate that decision makers in Ghana have priorities that differ from global technical guidance for HIV prevention among PWID. For instance, Needle/Syringe Exchange Programs (NSPs) and medication assisted treatment (MAT) are widely accepted as central interventions in reducing HIV transmission among PWID (21). However, as we can see in Table B3, stakeholders have allocated the least amount of hypothetical budget dollars to NSP and MAT programs and have instead identified targeted IEC and condom distribution as being high priority direct interventions for PWID. These priorities are likely a reflection of stakeholders' assessment of the political viability of implementing NSP and MAT programs in Ghana

Figure B3 Prevention Cascade for Preventing Mother-to-Child Transmission of HIV in Ghana



Source: Authors

Table B4. Stakeholder Priorities: Direct & Indirect Prevention Interventions for PMTCT

	Direct interventions		Indirect interventions	
Allocation within direct activities versus indirect factors	Provision of ARV prophylaxis to HIV positive pregnant women	$28	SCM for HIV test kits	$9
	Train more health workers in PITC	$17	Improve quality reproductive health (RH) and family planning (FP) services	$8
	Expand CD4 testing capacity	$8	Strengthen linkages between PMTCT services and ANC services	$7
	HMIS systems to track # of women receiving PMTCT	$7	Improve referral between PMTCT sites and ART sites	$6
	Provision of Cotrimoxazole to eligible women	$7	M&E of PMTCT programs	$3
Subtotal	$68		$32	
Total	$100			

Source: Authors

Interestingly, stakeholders ranked the current efforts at integrating PMTCT services into ANC sites as being average. This is also reflected in the hypothetical budget exercise that key informants were asked to complete; stakeholders allocated a substantial portion of the budget (approximate $28) to the provision of ARV and Cotrimoxazole prophylaxis, instead of towards training more health workers in PITC. Similarly, with respect to indirect interventions, KIs apportioned slightly more money ($9) to improving the SCM of HIV test kits compared with strengthening the linkages between PMTCT and ANC services ($7). Thus, this qualitative analysis indicates that the current country priority lies in improving the second half of the cascade in improving the proportion of pregnant women engaged (tested positive) to initiate PMTCT. Inevitably, however, to successfully decrease the mother-to-child transmission rates, the country must bolster its efforts to identify as many pregnant women who are HIV-positive and put them on treatment as soon as possible.

Table B5. Stakeholder Priorities: Direct & Indirect Prevention Interventions for Sero-discordant Couples

	Direct interventions		Indirect interventions	
Allocation within direct activities versus indirect factors	Focused advocacy to reduce stigma and discrimination (to encourage couples to test their HIV status)	$17	Ensure women in sero-discordant couples have access to good quality RH FP services	$10
	Provision of ARV prophylaxis to HIV+ partner	$17	SCM of HIV test kits	$5
	Distribution of condoms/ condom compatible lubricants	$14	Referral systems between PHC sites and ART sites (to link sero-discordant couples with ARVs)	$4
	Targeted BCC for co-habitating couples	$14	HMIS systems to track epi trends among sero-discordant couples	$4
	Train additional PHC workers in CHTC	$13	SCM of condoms/condom-compatible lubricants	$3
Subtotal	$76		$24	
Total	$100			

Source: Authors

Not surprisingly, when asked to complete the hypothetical budget exercise, key informants ranked focused advocacy to reduce stigma and discrimination and provision of ARV prophylaxis as the two main priorities among direct interventions for sero-discordant couples. Stakeholders also highlighted the importance of ensuring that women in sero-discordant couples, regardless of their HIV status, have access to Reproductive Health and Family Planning services.

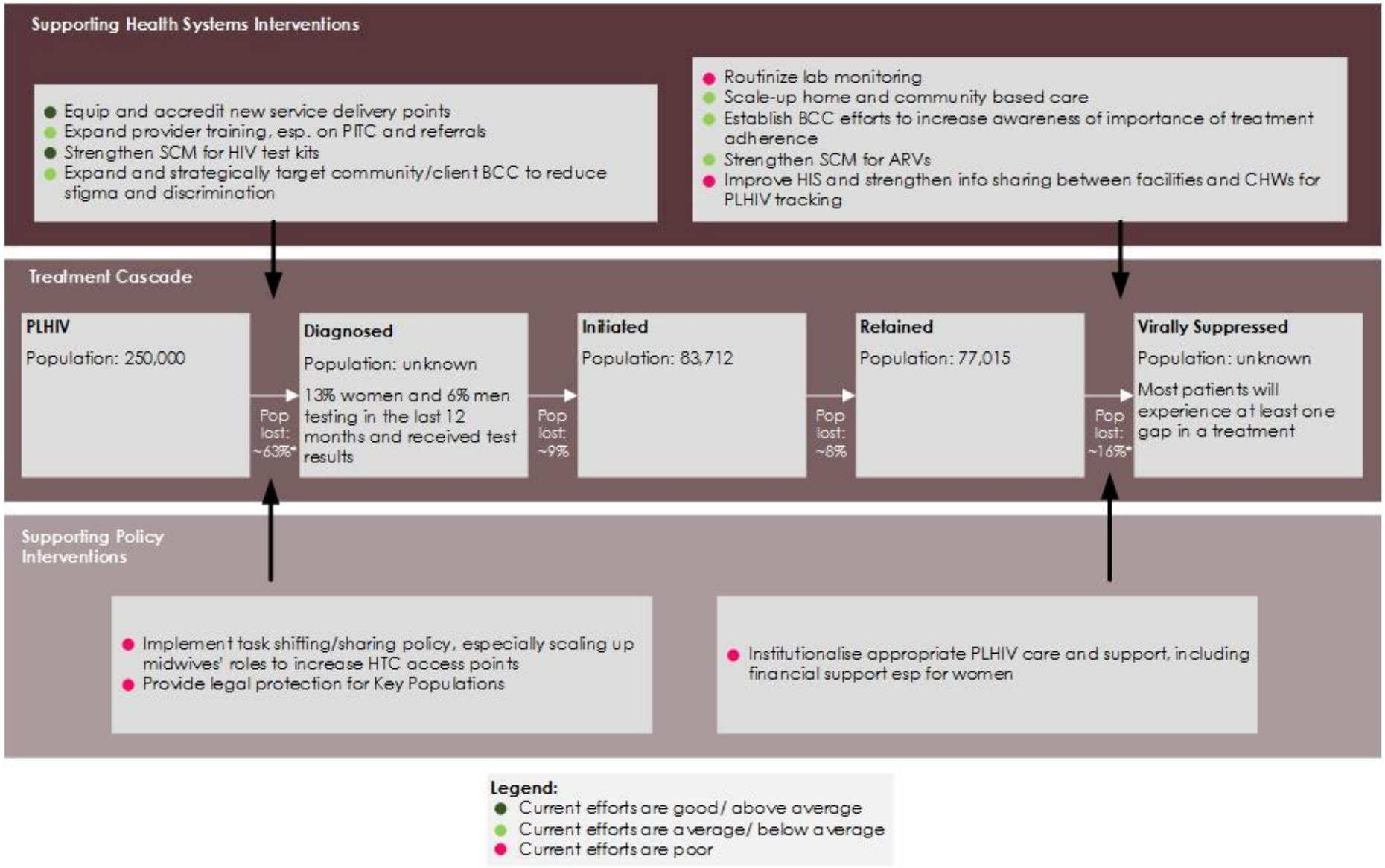
Table B6. Stakeholder Priorities: Direct & Indirect Prevention Interventions for the General Population (adults)

	Direct interventions		Indirect interventions	
Allocation within direct activities versus indirect factors	Targeted BCC and HTC provided by health workers	$19	SCM of HIV test kits	$16
	Focused advocacy to reduce stigma and discrimination	$15	Improve referral systems between PHC and ART sites	$10
	Distribution of condoms/ condom compatible lubricants	$11	HMIS systems to track epi trends	$8
	Strengthen efforts to provide sexual assault/rape crisis services	$5	SCM of condoms/condom-compatible lubricants	$7
	Targeted BCC provided through mHealth platforms	$4	Increase training for decision makers and health workers in SGBV issues	$5
Subtotal	$53		$46	
Total	$100			

Source: Authors

Stakeholders' budgetary rankings for direct and indirect interventions were as expected from initial discussion; HTC and STI screening and distribution of condoms/condom-compatible lubricants were ranked as leading direct interventions. For indirect interventions, stable and adequate supply of HIV test kits and strong referral networks were ranked as being most important. Addressing SGBV was ranked as being the lowest priority for the adult general population. Furthermore, budget allocations are also aligned with stakeholders' rankings of interventions.

Figure B4 Treatment Cascade and Supporting Interventions that Target Cascade Gaps in Ghana



Source: Authors

ANNEX C: SCENARIO 3 FUNDING ENVELOPE AND DETAILED COVERAGE ASSUMPTIONS

For *Scenario 3: Fiscally-Constrained Scenario*, we calculated the coverage of the interventions based on the resources available, as defined within the NFM proposal, and the intervention unit costs (Table C1). The proposal detailed the funding available between 2015 and 2017 to support Ghana's HIV program. Depending on the source of funding, use of that fund was earmarked to certain activities. Table C2 details the funding source, amount, and use.

Table C1 Unit Cost Used for Scenario 3 Setting

Intervention	Unit Cost
FSW comprehensive package of prevention services	$107.00
MSM comprehensive package of prevention services	$125.93
General population HTC	$10.01
General population condom distribution	$0.02
ART – Global Fund - Other Funding Source	$348.42 $343.00
PMTCT	$544.57

Table C2. 2015-2017 HIV Funding Available, by Source and Use

Source	Funding (2015-2017)	Allocation Notes
Global Fund	88,503,655	Allocation defined for each target group and supporting activities
Government of Ghana	83,120,710	Allocation undefined
US Government	28,000,000	Allocation defined; USG only funds prevention and supporting activities; since FY2015, USG/Ghana has had $12.5M total funding allocation, inclusive of USG management costs
Government of Ghana "Other"	193,679,007	Finance by social health insurance and private sector which are unlikely to fund direct prevention and treatment activities
United Nations	18,369,000	Allocation defined to technical assistance
Total Funding	411,672,372	

Source:(5)

Since some of the key interventions were expected to increase over the three years, the funding was appropriately proportioned to increase. From 2018 to 2020, we assumed that the funding will plateau and each source will maintain the funding that was allocated for 2017.

To define the coverage, we took a three-step process. First, we earmarked funding for treatment, as ensuring maintenance of coverage is critical. Second, we allocated funding for key populations, as controlling the epidemic within high risk groups is essential to turning the tide of the epidemic. Finally, we set the coverage goals for the general population with the funding that remained for prevention services.

Funding allocation for treatment by Global Fund and Government of Ghana funding composed the resource envelope for treatment. NFM proposal projected that both PMTCT and ART coverage will increase over the three years with Global Fund supporting the increase in ART, while the Government of Ghana supporting the increase in PMTCT. We assumed at all of Global Fund's funding will be used up to

reach their target. Using the unit cost derived from the NFM proposal, we estimated the resource needs for PMTCT and ART for Government of Ghana, and deducted that amount from the funding pool appropriately.

Whatever remained in the Government of Ghana funding was combined with the allocation from Global Fund for prevention and 90 percent of US Government funding to cover the cost of prevention services. Within the prevention, we first allocated funding for prevention programs for FSWs and MSMs. Here again, we referenced the NFM proposal to determine the targets for 2015-2017, and plateaued the coverage at the 2017 rate through to 2020.

There was minimal funding left over for the general population, and since the NFM proposal did not define coverage targets for condom distribution and HTC for the general population, we assumed a plateaued coverage throughout the model period (2015-2020). Even with this minimal allocation, there was not enough funding, so the coverage increase targeted by the NFM proposal for treatment was lowered by 10 percent to create fiscal space to maintain coverage of prevention services to the general population.

The funds remaining for the Government of Ghana and the US Government was combined with the allocation for supporting services for Global Fund, Government of Ghana "Other", and the United Nations to compose the funding for supporting services, such as administration, health systems strengthening, monitoring and evaluation, and strategic information.

It is important to note that while the coverage rate remains static over most of 2017 through to 2020, since the target population is projected to increase, the absolute number of people covered by these key interventions will also increase. Accordingly, the funding necessary for prevention and treatment increases through to 2020, reducing the funding available for supporting services over the course of the six years.

Table C3. Funding Envelope for 2015-2020, by Source and Intervention

Total Funds Available						
Funding Source	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**
Global Fund	22,292,638	29,589,354	36,621,663	36,621,663	36,621,663	36,621,663
Government of Ghana	26,285,975	28,298,739	28,535,997	28,535,997	28,535,997	28,535,997
US Government	9,322,323	9,318,337	9,359,340	9,359,340	9,359,340	9,359,340
Government of Ghana "Other"	64,559,669	64,559,669	64,559,669	64,559,669	64,559,669	64,559,669
United Nations	6,123,000	6,123,000	6,123,000	6,123,000	6,123,000	6,123,000
Total	**128,583,605**	**137,889,099**	**145,199,668**	**145,199,668**	**145,199,668**	**145,199,668**
Total Funds Available for Treatment						
Funding Source	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**
Global Fund	14,443,398	19,689,929	24,936,460	24,936,460	24,936,460	24,936,460
Government of Ghana	22,748,680	24,694,935	24,912,547	24,912,547	24,912,547	24,912,547
US Government	0	0	0	0	0	0
Government of Ghana "Other"	0	0	0	0	0	0
United Nations	0	0	0	0	0	0

Total	37,192,078	44,384,864	49,849,006	49,849,006	49,849,006	49,849,006
Total Funds Available for Prevention						
Funding Source	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**
Global Fund	4,044,317	4,849,093	5,434,591	5,434,591	5,434,591	5,434,591
Government of Ghana	2,371,916	2,370,902	2,381,334	2,557,586	2,740,580	2,930,004
US Government	8,390,091	8,386,503	8,423,406	8,423,406	8,423,406	8,423,406
Government of Ghana "Other"	0	0	0	0	0	0
United Nations	0	0	0	0	0	0
Total	**14,806,324**	**15,606,498**	**16,239,331**	**16,415,582**	**16,598,577**	**16,788,000**
Total Funds Available for Supporting Services (Administration, HSS, Strategic Information, etc.)						
Funding Source	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**
Global Fund	3,804,924	5,050,333	6,250,612	6,250,612	6,250,612	6,250,612
Government of Ghana	1,165,378	1,232,902	1,242,116	1,065,864	882,870	693,446
US Government	932,232	931,834	935,934	935,934	935,934	935,934
Government of Ghana "Other"	64,559,669	64,559,669	64,559,669	64,559,669	64,559,669	64,559,669
United Nations	6,123,000	6,123,000	6,123,000	6,123,000	6,123,000	6,123,000
Total	**76,585,203**	**77,897,737**	**79,111,331**	**78,935,079**	**78,752,085**	**78,562,661**

ANNEX D: LIST OF KEY INFORMANT ORGANIZATIONS

Organization	Number of Key Informants Interviewed
PEPFAR Ghana	2
National Expert	1
National AIDS/STI Control Programme (NACP), Ghana	1
Institute of Statistical, Social, and Economic Research, University of Ghana	1

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